Proposed Solar Thermal Power Station, Lot 10792 George Grey Road, Kalbarri WA

Environmental Management Plan

Bio Diverse Solutions

25/01/2017

DOCUMENT CONTROL

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1 Introduction

Allsage Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Management Plan (EMP) for the construction of a solar thermal power station in the SE corner of Lot 10792 George Grey Drive, Kalbarri and the associated road alignment to allow access to the solar farm from the west.

This EMP has been compiled to address legislative requirements and align best practise actions to implement the clearing of vegetation for construction of both the solar farm and the road alignment in an environmental, social and economically sustainable manner. The EMP aims to meet objectives of the development and environmental management actions to mitigate any adverse impacts on the natural environment.

The EMP has been documented to address specific Project Actions in the Short term (pre-construction clearing and during construction) and Long term (post construction activities and monitoring). The plan details specific actions, mitigation procedures, responsibilities of the team, training requirements, timeframes for implementation and monitoring.

The Short term environmental actions directly relate to implementation of native vegetation clearing, fauna management, weed and disease management. Tasks are determined by the level of involvement and responsibilities of the personnel for practical on-the ground implementation. This section of the EMP is designed for smooth and practical implementation to ensure that environmental goals of the construction of the solar station can be reached.

The Long-term actions relate to the post construction stages and the responsibility of the developer/management team post-construction. This period of time is essential to ensure all structures and controls implemented during construction, continue to work and do not cause any on-going environmental harm.

For successful implementation of this EMP, an Environmental Officer (Kathryn Kinnear Bio Diverse Solutions) who is appropriately trained has been appointed to oversee the environmental management and actions required as contained in this plan.

1.1 Relevant Legislation

This EMP has been prepared for the development to address environmental management issues. This document and the recommendations contained are aligned to the following policies and guidelines:

- *Wildlife Conservation Act 1950*
- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection (Clearing native vegetation) Regulations; and*
- *Environmental Protection Act 1986 (EP Act)*.
- *Conservation and Land Management Act (1984)*
- *Agriculture and Related Resources Protection Act 1976; and*
- *Environmental Protection and Biodiversity Act 1999 (EPBC Act).*

1.2 Subject Site

The “Subject Site” is defined as the proposed solar station and the small stretch of road joining the station to the existing vehicular access tracks. The subject site is a 26.45ha parcel of land located within the south-east corner of Lot 10792. The project site (Lot 10792) is located approximately 3.5km south of the Kalbarri town site. Please not that this EMP does not detail any management activities for the new access proposed form the north of Lot 10792.

To the south and east of the survey area is the Kalbarri National Park. To the west is public open space associated with the subdivision of Lot 9505. To the north is private land that has been earmarked for tourist attractions, conservation and groundwater protection (Shire of Northampton 2011). Please refer to Figure 1 below and Location Mapping Appendix A.

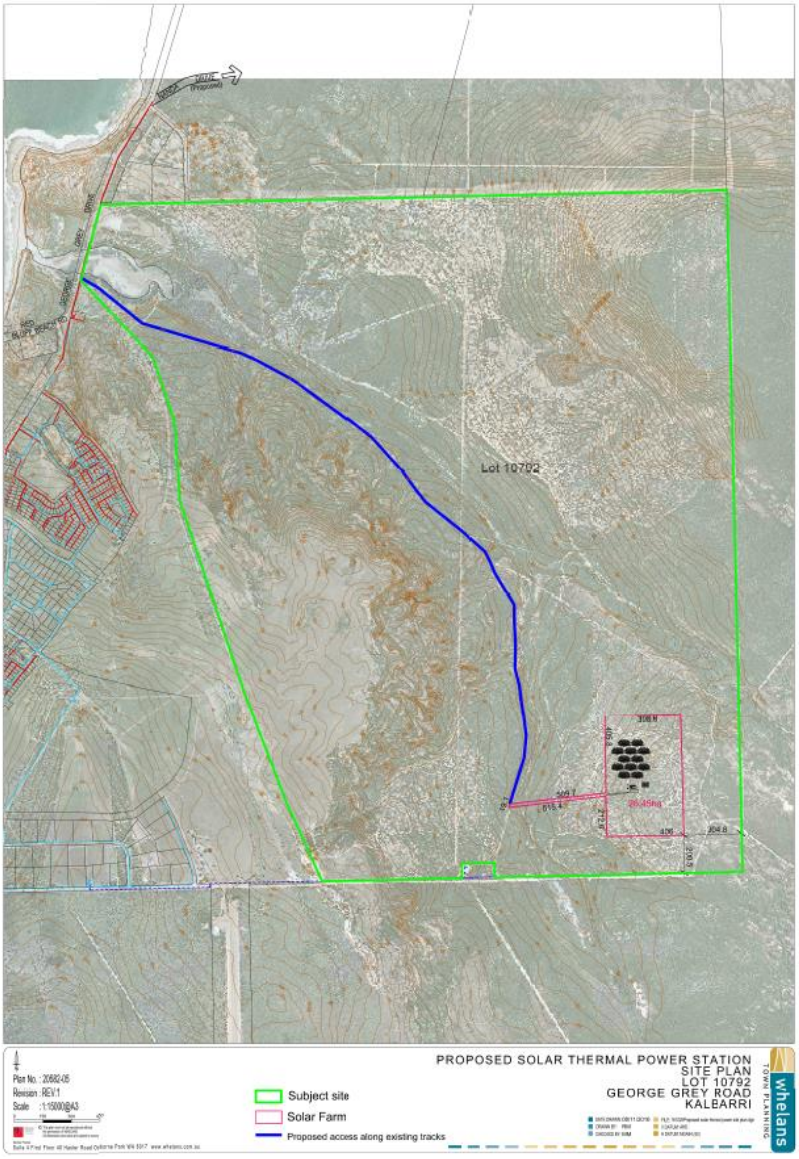

Figure 1 – Location of the proposed Solar Station and access routes, prepared by Veris (previously Whelans) 8th November 2016.

1.3 The Proposal

1.3.1 General Specifications

The purpose of the Solar Station development is to provide an additional power source to Kalbarri. The proposed development will be completed across two stages. Stage 1 will comprise of 12 solar thermal receiver blocks, increasing to a total of 48 receiver blocks at the completion of Stage 2. (AECOM 2016 – Noise Management Plan). Stage 1 is proposed to be 1 Mega Watt (MW) in size generating 15,000 kilowatt hours (kWh) per day, operating 24 hours a day. Currently infrastructure for Stage 1 will consist of:

- 12 Solarstore Graphite Storage towers (receiver blocks);
- 1,296 heliostat mirrors;
- 22 Cooling Towers;
- 2 Water tanks;
- 1 Transformer; and
- A building housing other required equipment (generators, plant and other facilities).

1.3.2 Construction methodology

The Shire of Northampton has requested the landowner/proponent prepare a Construction Management Plan. To date no construction methodology or schedule has been generated for the site, as such this report does not discuss in detail any construction methodology. It is expected the engineering and construction methodology will aim to minimise earthworks and restrict the clearing area of native vegetation.

Based on current known information the development will be staged. Prior to any building of the solar stations infrastructure all vegetation will be cleared (26.5 ha). Furthermore, it is proposed that the road alignment will consist of existing tracks throughout the Lot to reduce the level of clearing required. Bio Diverse Solutions expects these existing tracks will need further works such as widening, and have new disease free road base material brought in to be placed on the existing ground surface. To date detailed Flora survey has not been undertaken on the newly proposed road alignment to the north of the Solar Station.

As this report does not go into construction management all parties involved (construction managers etc.) should be aware of the Construction Management Plan and adhere to the details within.

2 Background to Project

2.1 Native Title and Aboriginal Heritage

A search using the Department of Aboriginal Affairs Aboriginal Heritage Inquiry System revealed no Registered Sites within Lot 10792.

2.2 Land use and Tenure

Lot 10792 on plan DP210152 is owned by Allsage Pty Ltd. which historically was used for farming / agricultural practices such as cattle grazing, but has since been destocked. The property is currently vacant land.

2.3 Heritage and Conservation areas

To the South and East of the subject site is the Kalbarri National Park. The park was gazetted in 1963, and is valued for its rugged scenery, coastal landscapes, wildflowers, the Murchison Gorge and rich Aboriginal heritage (Department of Parks and Wildlife 2015). Access to the National Park is via Ajana – Kalbarri Road for all inland gorge sites, and George Grey Road for coastal sites (DPaW 2015). The National Park is the location for several species of threatened flora and fauna as well as an ecological community. The park has also undertaken fauna reconstruction activities, one of which is the reintroduction of the Tamar Wallaby in 2010 (DPaW 2015).

Within Lot 10792 in the North-West corner is the proposed Wittecarra Creek Conservation Reserve. Within the reserve are several conservation values such as a population of *Chamelaucium marchantii* a Priority 3 species, the Subtropical and Temperate Coastal Saltmarsh Ecological Community, which is listed as Vulnerable, along with suitable habitat for several threatened bird species (Bio Diverse Solutions 2015).

2.4 Relationship to other plans and reports

This EMP report has been prepared to address environmental considerations associated with the development of a Solar Thermal Power Station within the locality of Kalbarri in the Shire of Northampton. This EMP should be read in conjunction with the following plans/reports prepared as part of this project:

- Soil and Water Management Plan - AECOM 2016;
- Noise Management Plan – AECOM 2016;
- Construction Management Plan - Shawmac;
- Level 1 Flora and Fauna Survey Report – Bio Diverse Solutions 2015;
- Bushfire Management Plan - Bio Diverse Solutions 2016; and
- Visual Impact Assessment Plan - Landscape Planners Pty Ltd.

Components of this EMP make specific referral to these documents and recommendations from these reports combined into the EMP, it is therefore recommended that these documents are referred to during the review and implementation of this EMP.

2.5 Consultation and Revision of EMP

This EMP has been compiled in consultation with the following organisations:

- Veris (previously Whelans Town Planners) – Vernon Butterly and Melinda Marshall;
- Shire of Northampton; and
- Department of Parks and Wildlife and Department of Environment Regulation – Feedback sought for finalisation of EMP.

Updated revisions of this EMP will occur throughout the life of this project to combine feedback from consulted organisations as received. Any changes or modifications to technique of construction or long term management changes, will require this report to be updated.

3 Objectives

The Environmental Management Plan (EMP) highlights all the environmental management actions required throughout the construction of the Solar Station. The activities are aligned to pre-construction, during and post construction activities and have specific references where required to other detailed management plans or documents.

Allsage Pty Ltd is currently the responsible entity for the construction and maintenance of the road alignment and solar station post construction. If another entity is responsible for the construction, then an update of this EMP will need to occur.

The plan makes specific construction actions for Allsage Pty Ltd to align duties to the Construction Project Manager, Environmental Officer, Site Supervisor and Machine Operators. The plan also documents the long-term maintenance and performance indicators for the site's environmental management post construction.

The objectives of this EMP are to:

- Document techniques to manage the construction of the site to meet Ecologically Sustainable Targets pre, during and post construction;
- Implement environmental indicators to monitor outcomes from the development process;
- Identify roles and obligations of stakeholders and responsibilities;
- Identify training and briefing requirements;
- Ensure that the clearing and bulk earthworks are done in accordance with detailed designs, best practise and sustainable measures;
- Align to environmental statutory requirements;
- Ensure that works are done while minimising environmental degradation;
- Ensure that all site personnel comply with the terms and conditions of the EMP;
- Respond to changes in environmental conditions during construction through monitoring and consultation; and
- Ensure mitigation measures are completed in an appropriate manner;
- Ensure all activities are aligned to current best practise, Legislation and Guidelines; and
- Document management procedures for the site post construction practical completion.

This document shall be reviewed and updated as the project evolves with a revision record as set out at the beginning of this document.

3.1 Risk Statement

Environmental Risks associated with the proposed works identified through the planning and consultation includes:

- Degradation to soil and adjacent vegetation from clearing native vegetation;
- Sedimentation or erosion from construction works activities;
- Topsoil displacement and the creation of dust;
- Fauna death and displacement;
- Disturbance to Tamar Wallaby;
- Nuisance (noise and visual) to residents in adjoining properties;
- Spread of weeds and pathogens into the site and off-site and associated impacts; and

3.2 Control measures

Allsage Pty Ltd will instigate primary control measures for the above stated risks during construction by:

- Appointing an Environmental Officer to oversee the implementation of the EMP;
- Appointment of a Civil Engineer as Project Manager to oversee all engineering construction specifications;
- Minimising vegetation clearing, disturbance and topsoil movement;
- Put in place erosion and sedimentation barriers before any works start;
- Control dust and noise by wetting road surface regularly with water truck;
- Control construction works between 0700hrs and 1800hrs;
- Control movement of weeds and pathogens incoming and outgoing of site; and
- Initiating long term monitoring and maintenance schedules/plans.

4 Environmental Objectives and Controls

As part of the construction of the Solar Station, Allsage Pty Ltd propose to undertake site works to the following objectives with control measures:

1. Preserve vegetation along the road alignment and utilise a minimal footprint;
2. Ensure any Tamar Wallabies within the Solar Station at time of vegetation clearing are encouraged to move to the National Park or the uncleared areas of Lot 10792;
3. Installation of a barrier fence surrounding the Solar Station to exclude ground dwelling fauna particularly Tamar Wallabies;
4. Creation of vegetation buffers on the southern and eastern boundary of the Solar Station to protect fauna;
5. Ensure there is zero spread of Phytophthora disease into uninfested areas within Lot 10792 and the adjacent Kalbarri National Park and Wittecarra Creek Conservation Reserve;
6. Appointment of Environmental Officer for the Project to implement environmental strategies as outlined in this EMP. Advice from the Environmental Officer shall feed into all stages of development.
7. Appointment of a Civil Engineer (Project Manager) to oversee site works, ensure construction methodology is conformed to, and undertake operational briefings to machine operators.
8. Undertake Stakeholder liaison to ensure all environmental objectives are met during the project. This will be undertaken by the Project Manager and Environmental officer as required and will include but not be limited to the following agencies:
    i. Department of Parks and Wildlife (DPaW) – Flora & Fauna;
    ii. Department of Water (DoW) – Water management;
    iii. Shire of Northampton – Landowner, approvals and maintenance; and
    iv. Local community groups and interest groups.

4.1 Construction Methodology

The physical construction of the road alignment and the Solar Station has the potential to cause a greater level of disturbance to the existing environment than the use of the area over time; therefore, it is proposed to have strict guidelines in place during the construction period.

4.2 Clearing

Access to the Solar Station will be along existing tracks, large scale clearing will not be required. The proponent has spoken to Parks and Wildlife Kalbarri office and they have been granted use of the DPaW management track from the end of Stiles Road through to Lot 10792 for construction purposes. Long term access to the Subject Site will be via a pre-existing track that has been graded to a roadway by the Water Corporation (*Pers Comms* B. Rourke, 2017) as shown in the Figure 1.

Clearing vegetation for the stretch of road joining the subject site (solar station) and the existing tracks should be undertaken in a manner to reduce unnecessary clearing. At the present time dimensions of this road are not known.

It would be intended that the vegetation/trees will be removed by mini excavator and/or small track loader (bobcat) and either placed (as ground stabilisation) on nearby areas currently devoid of ground cover as potential habitat or placed into a small truck and carted to stockpile for other areas devoid of ground cover or alternatively removed from the area completely.

Cleared vegetation will not be stockpiled on the site and left to become a potential fire hazard. Areas devoid of ground cover and vegetation exist due to previous track in the area and will be used as turnaround /passing lane areas for construction vehicles during the works and then rehabilitated with adjacent topsoil and removed vegetation at the completion of the construction works. This will enable the existing tracks to be left in a better state than the existing.

5 Project Actions

The project actions for this EMP have been divided into Short term actions (pre-construction and construction), Long term actions (maintenance and monitoring) and post construction activities.

5.1 Short Term Actions

Prior to commencement of construction of the site works, it is recommended that the following people are appointed and briefed on this document:

- Construction Project Manager/Civil Engineer – To have overall responsibility for implementation of control measures and ensuring that actions are carried out by all personnel on site.
- Environmental Officer (K. Kinnear Bio Diverse Solutions) – To give direction and guidance as required during the implementation of this EMP. The Environmental Officer shall also give guidance during the planning and design phases to ensure Environmental actions are implemented throughout the project.
- Site Supervisor – Delegated responsibilities from the Construction Project Manager, ensures all day to day activities and control measures are being implemented on site.
- Machine Operators – Specific requirements/methodologies documented in this plan to ensure environmental compliance.

The following sections document the activities and their associated environmental risks with the construction of this subdivision:

- Pre-construction Stage Activities – Project Coordination, Site inspections, Disease Management and clearing the site.
- Construction Stage Activities – All construction activities, Disease Management, Fire Management, and Site cleanup.
- Post Construction Stage Activities – Site inspections and monitoring.

Activities are listed under each stage and the Harm or Risk outlined. Assigned actions will be undertaken by appointed people. Allsage Pty Ltd commit to adhering to this program through the provision/commission of this report.

5.1.1 Pre-construction Stage

Activity: Project Coordination

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Waste generation, water, noise air and pollution.	Best Practice to minimise environmental impacts & ensure efficient management.	***Project Manager:*** Coordinate inspections with operators working on site regarding site management, timing of works and waste management. Plan the site, access, clean down areas, waste, and topsoil stockpiling.
Neighbour complaints	Notify of impending construction works.	***Project Manager:*** Liaise with Neighbours of pending works.
Reduce environmental harm	Briefing of construction stages	***Environmental Officer:*** Ensure all construction team are identified, and personnel are briefed of EMP. Prepare detailed map of track construction location of turnarounds, water points, hygiene requirements etc. and disseminate to Site Supervisor and Project Manager prior to commencement.
Spread of weeds	Ensure weeds are not spread into adjacent areas	***Project Manager:*** Ensure machine operators are aware of weed management plan prior to clearing operations. See Section 10. ***Environmental Officer:*** Ensure all infestations are identified, flagged and personnel are briefed. As per weed Management Plan. See Section 10.

Activity: Site Inspection cont ***Environmental Risk or Issue***	***Objective or requirement***	***Control measure***
Spread of weeds cont.		***Machine Operators:*** Clean down machines prior to entry to site to ensure no further infestations are brought on site. Ensure weeds disposed of to green waste off site. As per Weed Management Plan.
.		***Site Supervisor:*** Ensure all personnel briefed of weed Management. Weeds to be treated or disposed to green and not re-used for topsoil re-application.
Threatened Flora	Reduce impact, avoid	***Environmental Officer:*** Ensure Threatened Flora is identified, flagged and personnel are briefed.
Soil erosion	Minimise soil erosion, no materials to wash or blow from the site.	***Project Manager:*** Undertake drive/walk over and identify any areas that may need erosion and sediment control. Instigate soil erosion sediment traps or control measures. ***Site Supervisor:*** Check erosion and sediment controls are installed and communicated to site workers. ***Environmental Officer:*** Undertake site walk over, identify any areas susceptible to erosion, discuss methods to reduce effects with supervisor.

Activity: Disease Management

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Spread of disease	Minimise spread of disease & pathogens No wet soil movement policy	***Project Manager*:** Ensure all personnel are briefed on clean down of machine prior to commencement of works and if moving off site during works to prevent spread of pathogens between sites. ***Machine Operators:*** Clean down machines prior to entry to site to ensure no further infestations are brought on site. ***Environmental Officer*:** Ensure all personnel are are briefed on Hygiene Management Plan Ensure all operators are briefed on clean down of machine prior to commencement of works and if moving off site during works to prevent spread of pathogens between sites.

Activity: Habitat and Fauna Management

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Protection of Fauna	Ensure fauna are encouraged to leave areas to be cleared	***Project Manager*:** Ensure all personnel are briefed on clearing practices outlined in Section 9 aimed at reducing faunal injuries or fatalities. ***Environmental Officer:*** Ensure walk over of site prior to clearing to encourage fauna to move away. Be on hand to remove fauna as necessary during clearing operations.

Activity: Clearing the site

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Soil erosion	Minimise soil erosion	***Machine Operators:*** Remove vegetation as per engineering specification. ***Project Manager:*** Disturbance to be minimised and ensure erosion and sediment control measures are employed. Clearing is confined to necessary areas. ***Site Supervisor:*** Check daily and after rain any exposed soil is contained within the erosion and sediment controls.
Wastage of useable topsoil	Minimise the need to acquire topsoil from other areas for rehabilitation (batters)	***Machine Operators:*** Strip topsoil as required store adjacent to track in stockpiles no more than 0.5 metres high, if required place in designated areas.
Spread of weeds	Minimise the spread of weeds.	***Site Workers***: Weeds to be disposed of to green waste or treated as per weed management plan. ***Machine Operators:*** Ensure all machines are clean of debris prior to commencement of work and if moving offsite, are cleaned down to minimise spread of declared and noxious weeds.
Misuse or spill of hazardous materials	All pesticides, fuels and other hazardous materials are to be used and stored correctly	***Site Supervisor:*** Ensure trained people are utilising hazardous materials. Explain spill containment and clean-up procedures to all site workers. See Section 5.7.

Activity: Clearing the site cont. ***Environmental Risk or Issue***	***Objective or requirement***	***Control measure***
	No storage of hazardous materials on site	***Site Supervisor:*** Ensure that all machines are re-fuelled from mobile tankers. Ensure any refuelling activities are carried out in the designated refuelling area
	Spill containment	***Site Supervisor:*** Ensure containment and procedures are carried out as per Section 5.7 of this document.

5.1.2 Construction Stage

Activity: All construction activities

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Soil erosion Check	Minimise soil erosion.	***Site Supervisor:*** Check daily and after rain any exposed soil is contained within the erosion and sediment controls.
Noise Pollution	Minimise noise to adjacent properties.	***Site Supervisor:*** Ensure machine operations are carried out between 0700 and 1800hrs, adjacent to private properties.
Dust to adjacent areas	Minimise dust onto adjacent properties.	***Site Supervisor*:** Ensure water trucks/ light tankers used to control dust. Avoid working in periods of high/ extreme winds.
Misuse or spill of Chemicals	All pesticides, fuels and other hazardous materials to be used and stored away from site	***Site Supervisor***: Ensure that only trained workers use hazardous materials. Ensure that hydrocarbons (fuels, oils) are not stored on site. Explain spill containment and clean-up procedures to all workers as per Section 5.7.
Re-fuelling machinery / vehicles	Ensure spills are contained	***Site Supervisor*:** If re-fuelling required on site, ensure does not occur on or adjacent to creeks/wetlands. If machinery breakdowns occur ensure containment procedures in Section 5.4 of this document. Environmental Officer to be notified immediately of any spills or non-conformance.

Activity: All construction activities cont.

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Re-fuelling machinery / vehicles	Ensure spills are contained	**Site Supervisor:** Ensure waste management occurs and no spent oil cartridges left on site. **Machine Operator:** Refuelling to occur of site, if breakdown occurs any spill containment to occur as per procedures in Section 5.4. Maintenance of machines is to occur of site. **Environmental Officer:** Ensure all operators aware of spill containment procedures, refuelling locations and contingency procedures if a mechanical breakdown occurs see Section 5.4.

Activity: Disease Management

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Spread of disease	Minimise spread of disease & pathogens	***Project Manager*:** Ensure all personnel are briefed on clean down of machines prior to commencement of works and if moving off site during works to prevent spread of pathogens between sites. ***Site supervisor:*** Ensure site gated and locked daily to prevent illegal access and spread of pathogens during construction periods. Ensure all personnel briefed on hygiene standards. Accompany machine operators on any days when clearing vegetation.

Activity: Fire Management

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Ignition of wildfire	Minimise risk of ignition	***Site supervisor:*** Days which are "Extreme" Fire Danger Index (FDI), all machinery operation to cease to ensure there is no risk of wildfire ignition. A fire tender vehicle be located on site at all times during site works. Observe vehicle movement / harvest ban days as set by LGA. ***Project Manager:*** Monitor DFES website regarding foreseen fire weather, extreme FDI days and vehicle / Harvest bans. ***Machine Operator:*** Ensure any vegetative matter is respread immediately or removed and not stockpiled for any length of time causing combustion.

Activity: Site Clean-up

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
Pollution into the environment	No waste or pollution to be left on site	***Site Supervisor:*** Site inspection along the route daily and at completion of works to ensure no waste material is left behind.

5.1.3 Post Construction Stage

Activity: Site inspections

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
6 monthly inspections	Ensure that no weeds have come into remnant vegetation and rehabilitation is successful	***Environmental Officer:*** Site inspection to assess weeds invasion as not occurred. Check status of rehabilitation, planting as necessary.
	Maintain surface water flows and erosion controls as per the Soil and Water Management Plan	***Project Manager:*** Inspect all stormwater structures, culverts pipes etc. to ensure water flows are not obstructed and working as per engineering specification. Instigate maintenance if structural controls not working as per requirement or soil erosion is evident.
	Ensure perimeter fence is in working condition and is keeping ground dwelling fauna out of the solar station.	***Project Manager:*** Inspect perimeter fence for damage. Instigate Maintenance if required. At all times of the year, in the event fauna has entered the Solar Station, the relevant parties (e.g. Environmental Officer / DPaW) will be contacted to safely remove individuals.
	Monitoring of effects of the Solar Station on birds.	***Environmental Officer:*** Site inspections and monitoring undertaken to assess how birds react to the Solar Station. ***Project Manager:*** Ensure any negative impacts to birds are recorded and relayed to the Environmental Officer.

Activity: Site inspections

Environmental Risk or Issue	*Objective or requirement*	*Control measure*
12-month inspection	Ensure that no weeds have come into remnant vegetation and rehabilitation is successful	***Environmental Officer:*** Site inspection to assess weeds invasion as not occurred. Check status of rehabilitation, planting as necessary.
	Maintain surface water flows and erosion controls as per the Soil and Water Management Plan	***Project Manager:*** Inspect all stormwater structures, culverts pipes etc. to ensure water flows are not obstructed and working as per engineering specification. Instigate maintenance if structural controls not working as per requirement or soil erosion is evident.
	Ensure perimeter fence is in working condition and is keeping ground dwelling fauna out of the solar station.	***Project Manager:*** Inspect perimeter fence for damage. Instigate Maintenance if required. If fauna has entered the Solar Station, contact the relevant parties to safely remove individuals.
	Monitoring of effects of the Solar Station on birds.	***Environmental Officer:*** Site inspections and monitoring undertaken to assess how birds react to the Solar Station. ***Project Manager:*** Ensure any negative impacts to birds are recorded and relayed to the Environmental Officer.
	Maintain disease free site	***Hygiene Officer*** Undertake inspection, testing and mapping to. verify disease extents compare to pre-construction mapping and give recommendations on any further hygiene requirements or disease management.

5.2 Environmental Training Requirements

Environmental training for all site construction workers includes:

- A site induction;
- Familiarisation with site environmental controls; and
- EMP briefings for any new construction crews.

The Environmental Officer will be responsible for the delivery of any training. As the project is small in nature only one machine operator is anticipated on clearing/works machinery. Truck drivers associated with delivery of road materials. This is the total amount of personnel anticipated for the project. The training will include a full briefing of the EMP undertaken on site, with maps given of the construction plan.

Title & signature	***Training required***	***Trainer***	***Verification/date***
All work crews	Site induction	Site Supervisor	
Site Supervisor and works crews	Familiarisation with EMP & standards.	Environmental Officer	
All works Crews	Weed Management and Fauna Management	Environmental Officer	

5.3 Monitoring and Contingency Planning

Environmental controls during construction will be checked at frequent intervals as outlined in Table 2 below. This will be the responsibility of the Site Supervisor and the Environmental Officer to ensure all the below activities are carried out.

Table 2: Environmental Monitoring Activities During Construction

Frequency & Compliance Number	***Activity***
Daily	Check all sediment controls
	Check waste materials collected from site are correctly sorted and stored (i.e. green waste, refuelling in designated areas only).
	Check personal safety equipment before each use.
	Check dust filters on equipment.
	Visually check vehicles and equipment for leaks or potential oil spills.
	Check signage, gates and demarcation tapes (trees and dieback) in place
	Check noise suppression devices on equipment prior to working.
	Check vehicle/hygiene requirements have been met.
	Check topsoil and cleared vegetation has been appropriately placed.
	Check no unplanned vegetation clearing has occurred and flagged habitat trees remain.
	Incident reports have been completed if required.
	Communication with DPAW as required as adjacent neighbours & stakeholder (DPAW to provide 1 point of contact)
Twice weekly	Check containers of hazardous materials are properly stored and not damaged (away from site)
	Ensure dust suppression controls in place

Frequency & Compliance Number	*Activity*
Weekly	Visually check vehicles and equipment for leaks or potential oil spills
After rain (i.e. >10mm)	Inspect all sediment control structures
	Check all drains are free from debris or chemicals (i.e. hydrocarbons)
	Stormwater structures are checked and/or are cleaned out
	Check for erosion after wet periods and winter months
	Ensure drainage structures are working as per Engineering specification
Monthly	Ensure sediment controls are working appropriately
	Ensure revegetation areas are healthy and free of weeds
	Apply brush from adjacent vegetation on any bare areas
	Remove weeds as per Weed Management Plan
	Ensure public access is restricted and signage in place

5.4 Control of Environmental Incidents

An important aspect in the environmental program is management of non-conformance or incidents. An environmental incident is an event which could result in pollution to the local environment. The planning of site works and methodology as outlined within this management plan limits the risk and harm of construction works impacting on-site or off-site.

If an incident or event occurs during construction, it should be emphasised to all personnel working on site that all incidents are documented. Investigations should be conducted and action plans established in order to ensure the event does not happen again. The Environmental Officer will be responsible for maintaining records of Environmental incidents and reporting.

Examples of an “incident” for this project may include:

- Hygiene protocols not adhered to;
- Topsoil and cleared vegetation has not been appropriately placed;
- Unplanned vegetation clearing has occurred;
- Mechanical breakdown occurring along a waterway and hydraulic oil spill occurs;
- Complaints from “stakeholders” or neighbours;
- Any event which causes non-compliance with the EMP.

5.5 Corrective and Preventative actions

An Environmental Investigation should include the following basic elements:

- Identify the cause of the incident;
- Identifying and implementing the necessary corrective action;
- Identifying the personnel responsible for carrying out corrective action;
- Implementing or modifying controls necessary to avoid repetition;
- Recording changes in written procedures required; and
- Reporting to the appropriate government agencies if required.

5.6 Contingency Procedures

Contingency measures are included within this management plan. These protocols are designed to reduce adverse environmental impacts and provide an early detection of non-conformance and subsequent corrective action. Any modifications to the outlined strategies and methodologies to meet unexpected conditions shall be agreed to by the Environmental Officer. Monitoring shall be used to confirm the effectiveness of any changes.

Should it be identified by any personnel involved in the project there is a non-conformance to the acceptable methodology or there is reason to cause environmental harm, in consultation with the Site Manager and Project Manager, activities should cease during resolution of the required change in methodology.

The Environmental Officer should be notified of any environmental non-conformances and undertake site investigation. It will be the responsibility of the Environmental Officer to report any Environmental Incidents to the appropriate government agencies (e.g. Department of Regulation – contamination, spills etc, DPaW impacts to adjacent National Park).

5.7 Spill Management Procedures

The following information is from the DPAW Spill Management Brochure (DEC 2011). This should be the methodology employed should a spill from fuel or chemical occur.

Dealing with minor spills

A small spill is considered to be a spill of 5 litres or less providing the product is not concentrated. For concentrated products of any quantity the spill must be treated as a large spill.

1. Assess safety. Make sure that people are kept clear, and that you have the right training and equipment to deal with the spill.
2. Stop the source. Providing it is safe to do so, stop the spill at its source. This may involve righting an overturned container or sealing holes or cracks in containers.
3. Contain and clean up the spill. The spill should be mopped up immediately.
4. Record the spill. Record when, what, how and where the spill occurred, clean up measures undertaken and the names of any witnesses. Also, make note of what changes can be made when handling, transporting or storing chemicals to ensure a similar incident does not happen again.

Dealing with large spills

A large spill is considered to be anything over 5 litres or concentrated chemicals of any volume.

1. Assess safety. Make sure that people are kept clear, and that you have the right training and equipment to deal with the spill.
2. Consult the Material Safety Data Sheet (MSDS). The MSDS will have instructions on how to deal with specific chemical spills.
3. Put on protective clothing. If necessary, put on gloves and goggles, a mask and an apron.
4. Stop the source. Providing it is safe to do so, stop the spill at its source. This may involve righting an overturned container or sealing holes or cracks in containers.
5. Contain and control the flow. The spill should be prevented from filtrating into the ground or entering the stormwater system. The outer edge of the spill should be dammed with rags, blankets, sand, sands bags, mops and/or absorbent booms.
6. Clean up the spill. Promptly cover the spill using absorbent materials such as the correct absorbent granules for the product (Note that some strong acids will react with some types of granules and sawdust), sand and rags, being mindful not to splash the spill. Using a dustpan or spade, the absorbent granules or sand must then be scooped up and placed into a container. This waste material is not to be buried or thrown into the environment. The method of disposing this waste will depend on the amount and the type of chemical that was spilt. The Department of Environment Controlled Waste Section will advise on the appropriate disposal of hazardous substances. There are several contractors that will dispose of contaminated substances and soils. All contact phone numbers can be found below

7. Notify the appropriate authority. If the spill does enter a stormwater drain or open ground, the Department of Environment and your local council must be notified. Please refer to the phone numbers listed below. If there is a hazard to health or property, call Fire and Rescue on 000 immediately.
8. Record the incident. Record what, how and where the spill occurred and the names of any witnesses. Also, make note of what changes can be made when handling, transporting or storing chemicals to ensure a similar incident does not happen again.

Who to call in an emergency

All hours phone numbers

Life / property emergencies: Ambulance, Fire or Police	000
Pollution emergencies - Department of Environment	1800 018 800
Poisons Information Centre	13 11 26
Water Corporation – Emergencies and water service difficulties	13 13 75

Business hours phone numbers

Department of Fire and Emergency Services Authority	9956 6000
Department of Environment Regulation	6467 5000
Department of Mines and Petroleum	9222 3333
Department of Parks and Wildlife Kalbarri Office	9937 1140
Department of Parks and Wildlife Geraldton Office	9964 0901

6 Long-term Actions

Allsage Pty Ltd are responsible for the site maintenance during and post construction.

Table 3 – Long Term Management

Management Objective(s) & Compliance Number	***Management Aims***	***Management Action(s)***	***Stakeholders***	***Performance Indicator***	***Indicator Measurements***	***Monitoring frequency***
Weed Management	Reduce the impact and spread of weeds. See Weed Management Plan section 10.	Remove all weeds through actions including: Hand/mechanical removal; and Spot spraying of individual plants.	Shire of Northampton Allsage Pty Ltd. Bio Diverse Solutions	Weed populations identified on site	The recurrence of weed populations is minimal; and New populations of weeds do not occur.	Implement weed monitoring 6 and 12 monthly program post construction for 3 years. As per Weed Management Plan.
Water quality, water flows and Stormwater Management	Ensure stormwater flows from the road construction do not impact natural environment; Ensure water flows are not interrupted as per predevelopment flows; Ensure all stormwater controls are maintained in correct working function; Ensure the natural surface water flows and flooding regime of the area is not altered; and Prevention of build up of sediment in waterways as a result of erosion.	Ensure water quality controls and structures are in place and in correct working order as per the Soil and Water Management Plan; and Inspections of stormwater structures every 6 months or after heavy rainfall events. Ensure surface water flows are maintained as per pre-development. Maintenance of structures as required ensuring erosion does not occur.	Shire of Northampton Allsage Pty Ltd. Bio Diverse Solutions Appointed Engineers	Hydrological function maintained, no obstruction or pooling of water as per construction flows. Drains, creeks and wetlands water quality/condition (appearance), vegetation condition and flow condition. No erosion occurs at structures or along road as a result of road construction.	No unusual vegetation deaths, sludge or scum forming in and around the drains and pipes; Water appears to be clean and clear; carrying only suspended natural vegetation from natural stream or drainage lines and not carrying any scum or foreign material; and Surface flows are maintained.	6 monthly monitoring of all stormwater structures and/or after heavy rainfall events (>1:100 ARI) post construction for 3 years.
Rehabilitation of degraded areas from any construction activities.	Rehabilitate degraded areas from construction activities such batters or drains or clearing of native vegetation areas.	Revegetate degraded areas with preserved topsoil; Remove invasive weed species to prevent any vegetation structure decline; Prevent erosion through established vegetation and/or erosion control methods; and Collect adjacent seed in spring or flowering periods and spread in following autumn/winter periods to “bulk out” revegetation areas if required.	Shire of Northampton Allsage Pty Ltd. Bio Diverse Solutions	The area (m^2) of degraded vegetation (percent weed establishment); Poor native vegetation condition of degraded areas; and Erosion does not occur after heavy rains or high winds during dry periods.	The area (m^2) of degraded vegetation (weeds) has been reduced and continues to reduce in area; Native vegetation continues to grow without assistance; Deaths in native vegetation natural; and Erosion is minimal during high rainfall months or during dry periods with high winds.	6 monthly monitoring of rehabilitation areas, post construction for 3 years, as per Rehabilitation Plan.

Management Objective(s) & Compliance Number	*Management Aims*	*Management Action(s)*	*Stakeholders*	*Performance Indicator*	*Indicator Measurements*	*Monitoring frequency*
Public Access and Restricting access to sensitive areas (National Park)	Public Access is restricted and access to sensitive areas restricted. Illegal entry is sign posted.	Local traffic only, signage installed and checked regularly; Gated and signed “Controlled Closed Road” at access point from George Grey Road; and Ensure signage visible and gates closed and not damaged.	Shire of Northampton Allsage Pty Ltd.	Access is via George Grey Road for owners and visitors to the Solar Station; and Illegal entry is reported to the local Police.	Regular patrols monitoring vehicles around the site; and New signs of unlawful access.	Quarterly and informal checks post construction for 3 years.
Monitoring	Remnant vegetation and rehabilitation health is monitored; Ecosystem health is maintained in adjacent areas to predevelopment status; and Ensure water quality controls and structures are in place and in correct working order maintaining pre-construction flows.	12-month maintenance period is abided by Allsage Pty Ltd. from time of completed track construction works; and 6 monthly checks for a period of 3 years by the Environmental Officer as per Weed Management Plan, Hygiene Management Plan, Fauna Management Plan, and Rehabilitation Management Plan, and Consultation with the DPaW and Shire of Northampton as required on any aspect of site management.	Allsage Pty Ltd. Bio Diverse Solutions	Localised deaths of remnant vegetation from rehabilitation within road reserve; Water flows obstructed, pooling of water in previous areas not historically occurring; Weed infestations occur; and Biodiversity of local area is reduced	Regular maintenance patrols and reports by Environmental Officer; and Consultation with the DPaW regarding any unusual ecosystem health indicators.	Annual and 6 monthly checks post construction for 3 years.
Fauna Management	Remnant vegetation attracts native fauna; Thick areas of remnant vegetation are conserved to provide shelter and habitat for native fauna; and There is no displaced fauna or unusual deaths.	Informal checks within the subject site, as well as formal bird monitoring to assess impacts (if any) from the Solar Station itself; Road speeds are maintained as a low speed environment to ensure wildlife not affected; and Signage and gates in place to ensure no illegal entry to National Park.	Shire of Northampton Allsage Pty Ltd.	Fauna diversity; Signs of habitat use by local species in road reserve; Fauna stay within remnant areas; and No signs of negative impacts to bird species.	During maintenance visits, wildlife noticed in remnant areas and no bird deaths recorded; and Remnant areas are vigorous and show no signs of demise.	Annual and 6 monthly checks post construction for 3 years.
Fire Management	Prevent Fire Hazards within Lot 10792.	Ensure fuel loads in adjacent uncleared areas are managed as per the Bushfire Management Plan; Access along the road is unimpeded for emergency entry/egress; and Ensure any maintenance activities with machines do not occur on High Fire Danger Index (FDI) days.	Shire of Northampton Allsage Pty Ltd.	Fire occurrence is minimal or none; and All structures are in good working order from regular checks. Road is accessible at all times for emergency access/egress.	Leaf litter including wood material and grasses poses minimal fire hazard; Machine movement bans during high FDI; and No fires originating from project site.	Yearly prior to summer period for a period of 3 years post construction.

Management Objective(s) & Compliance Number	***Management Aims***	***Management Action(s)***	***Stakeholders***	***Performance Indicator***	***Indicator Measurements***	***Monitoring frequency***
Generate and maintain Community involvement	To be informative to neighbours regarding the construction of the track; and ongoing environmental management.	Ensure neighbours are notified of the milestones of the construction period; and Notify neighbours of any maintenance works.	Shire of Northampton Allsage Pty Ltd.	Complaints from adjacent residents.	Amount of complaints post construction activities.	As identified by the Shire of Northampton.
Consultation with DPaW	During the construction and maintenance of the proposal the proponent shall implement the Environmental Management Plan approved in consultation with DPaW.	Give updates on the progress of construction and maintenance activities; Provide DPaW with and updates to EMP; and Maintain liaison as adjacent neighbour and fauna management issues.	Shire of Northampton Allsage Pty Ltd. Bio Diverse Solutions DPaW	Actions are fed back to DPaW annually or as occur.	No complaints from DPaW Communication is via email, post and phone calls as required; and Updated EMP's provided as required.	Annual and as required or as maintenance occurs; and DPaW to provide 1 point of contact.

7 Threatened Flora Management Plan

There were no Threatened Flora species detected within the proposed subject site (Solar Station) or along the proposed road alignment during the September 2015 Flora survey undertaken by Bio Diverse Solutions. The new proposed access track from the North and West has not been surveyed for Threatened Flora pursuant to the Wildlife Act 1950. It is recommended that a Targeted Flora Survey occurs prior to construction.

A Clearing Permit will be required prior to commencement of any clearing or construction works. If through the Targeted Flora Survey of the new road alignment threatened flora is identified the following procedures / methodology are to apply:

- Environmental Officer to undertake site identification during spring and 2 weeks prior to works commencing, positively identify species and locations;
- Undertake briefings with all site personnel to avoid populations, a minimum of 10m buffer to apply where possible;
- Periodic site survey to ensure there is minimal impact to species; and
- Where species cannot be avoided, limit extent of disturbance and steepen road batters to ensure minimal disturbance to species, hand transplant plants where able to adjacent areas.

8 Hygiene Management Plan

This Hygiene Management Plan is a guide for the management of all pathogens and diseases and has been prepared as per guidance and best practise of the DPAW "*Phytophthora cinnamomi* and Disease Caused by it, Volume I - Management Guidelines", (which is the current best practise guidelines document for disease management) and *Managing Phytophthora Dieback Guidelines for Local Government* (DWG, 2000). This plan is to control all forms of Dieback (*Phytophthora species)* and other soil vectored plant diseases.

Dieback refers to Phytophthora, a plant disease that impacts remnant vegetation. Disease is a potential problem when equipment is brought to the site from a dieback infected area.

All vehicles and equipment to be used on site for clearing and land reinstatement will be inspected for signs of adherent soil and other material and brushed/high pressure or hosed down prior to entering the site.

All clearing, maintenance and construction operations are to be carried out in dry soil conditions only.

8.1 Aim of Hygiene Plan

The aim of this plan is to ensure there is zero spread of disease into Lot 10792 George Grey Drive. This plan will document the management measures for successful completion of the project in terms of education to personnel, decontaminating equipment, and defining access measures.

8.2 Disease Management

The following will apply to all aspects of operations and form part of the hygiene management briefing to all site workers:

- Earth moving vehicles and equipment are to be cleaned prior to entering site;
- Visual inspections on vehicles, plant, equipment and footwear are clean when entering the site;
- Footwear to be cleaned via brushing and spraying methanol on shoes prior to site entry.
- Access to the site during construction will be controlled (fenced and gated and locked when unattended);
- Completed areas will be rehabilitated as soon as practicable;
- The rehabilitated surface will be free draining and not contain wet or waterlogged soils;
- Materials used in rehabilitation will be dieback free from on-site material; and
- Road and transport vehicles are to be restricted to defined track, loading and turn around areas.

Cleandown specification:
A visual inspection is necessary to determine whether or not boots, vehicles, machinery or equipment is free of a build up of:

- Clods of soil and plant material and/or
- Slurry consisting of a mixture of soil, plant and water;
- Dust and grime adhering to the sides of vehicles need not be removed before entering uninfested areas;
- Records of inspections and cleandowns are to be maintained.

(CALM 2003)

9 Fauna Management Plan

The Solar Station site has been surveyed for significant Fauna under the *Wildlife Protection Act 1950* and the *Environmental Protection and Biodiversity Act 1999,* please refer to Level 1 Flora, Vegetation and Fauna Survey Report (Bio Diverse Solutions 2015) for further detail. A Fauna survey was undertaken in September 2015. During this survey the only listed species identified within the subject site was Tamar Wallaby (*Macropus eugenii subsp. derbianus*). This species appeared to be a transient visitor to the site and is unlikely the clearing of vegetation would have a detrimental impact due to the connectivity of surrounding remnant vegetation (both within Lot 10792 and the National Park). (Bio Diverse Solutions, 2015). For further details on findings of the fauna survey please refer to the above mentions report.

There is some evidence that suggests solar farms can result in bird fatalities through what has been termed the “lake effect” whereby birds and their prey mistake the reflective solar facility for water and fly towards it, resulting in deaths from collisions and burns (Kagan *et al*. 2014; RSPB 2014; Bio Diverse Solutions 2015). Furthermore, the reflective nature of solar farms can also result in temporary blindness of fauna. Please refer to Appendix B – Department of Parks and Wildlife Correspondence for further detail.

Based on these findings the following management measures have been developed to reduce the likelihood of impacts to native fauna:

- Minimal extent of clearing vegetation for the road alignment, including the additional section needed to link the subject site and the existing track;
- Briefing of personnel prior to commencement of works on any limitations of clearing;
- No clearing of native vegetation outside of the subject site, to ensure the integrity of the remaining remnant vegetation is retained. This will help maintain existing connections to surrounding habitat, facilitate genetic transfer for fauna on site and in general allows for the movement of fauna regionally;
- Installing a perimeter fence around the subject site to exclude fauna particularly Tamar Wallabies. The design of this fence has been discussed with the Department of Parks and Wildlife. This fence will be similar to a design outlined in Photographs 1 and 2 over the page. The wire must be high enough (approx 6ft) to stop Wallabies from entering the site. Furthermore, additional sections of wire should be attached to the bottom of the fence and buried to stop fauna digging underneath;
- The fence is to be constructed post clearing of the subject site under direction of the Environmental Officer;
- Routine site checks for fauna post construction of the fence (defects, displaced fauna etc.) are to occur; and
- Ensure there are vegetation buffers surrounding the subject site to provide a visual buffer. The buffer along the southern boundary should be 200m wide and 310m wide on the eastern boundary. The heliostat mirrors to be used are parabolic with focal lengths ranging between 20 and 40 meters. The closest mirror to the perimeter fence of the solar station is to be setback 50m (*Pers Comms* B. Rourke, 2017). The vegetation buffers and distances from mirrors to the perimeter fencing of the Solar Station will provide an adequate barrier to the movement of ground dwelling fauna as well as ensuring no concentrated heat or light can leave the site.


Photographs 1 and 2: Possible fence design to be implemented.

The following management controls are to apply and will be implemented to minimise impacts on native fauna:

- Clearing will be undertaken from a single point in a single direction allowing fauna to leave the area on their own accord. Physical shepherding of animals ahead of the machine(s) will also help to reduce injuries and fatalities of fauna in the immediate vicinity;
- Ensure bushfire control measures are in place during all operations (no vehicle movement on “Very High and extreme” FDI days, fast attack unit on site etc);
- Native fauna encountered during clearing will be allowed to make their own way from the site. If this is not possible operations will cease until the Environmental Officer has assessed the impact on the fauna species; and
- Any injured fauna encountered by the Contractor is given to local animal carers or a local vet.

An environmental briefing will occur prior to construction activities commencing to inform the Project Manager, Site Supervisor and all machine/vehicle operators of any sensitive areas and flag tape/signage/demarcation requirements. If during site works, there is any evidence of Threatened Fauna present (as listed in the Preliminary Fauna Report) then the Environmental Officer should be notified and work cease until a site assessment has been undertaken.

Briefing information to site personnel will include but not be limited to:

- Flagging and demarcation of areas not to be cleared;
- Ensure that any Threatened or suspected to be Threatened Species are reported to the Environmental Officer; and
- Ensure all operations are undertaken with a minimal footprint and the clearing of native vegetation is restricted to defined and necessary areas.

Important fauna contact details

Wildcare helpline	9474 9055
Department of Parks and Wildlife – Kalbarri Office	9937 1140
Department of Parks and Wildlife Geraldton Office	9964 0901

10 Weed Management

Weed management is to be used in conjunction with disease and hygiene management. The following Weed Management Plan is to apply to all aspects of site operations. All operations shall conform to this weed management plan, and monitoring to occur post construction for any infestations. Weed management will primarily be undertaken through avoiding introducing new weeds to the area.

10.1 Aims of Weed Management Plan

The aims of Weed Management will be:

- Maintain a weed free environment within the subject site, and along the road alignment;
- Ensure all vehicles are clean on entry prior to any soil or vegetation movement;
- Comply with Hygiene Management Plan in Section 8;
- Site is to be secured to prevent trespassers illegally accessing, dumping rubbish and green waste;
- All weeds on site removed promptly on discovery;
- Remove weeds from least affected areas to the most affected areas (Bradley Method);
- Do not use weed affected soils for any rehabilitation, but remove infected soils to waste disposal; and
- Regularly monitor the site for invasive species.

If weeds are discovered on site, they will be treated using the following methodology:

- Large woody weeds will be burned, poisoned or removed from site and disposed to approved green waste;
- Small weeds will be sprayed by a licensed contractor or landholder; and
- Initial follow up spraying will be undertaken at 6 months and 12 months and repeated as necessary.

10.2 Program for weed control

The following program for weed management will be implemented prior to construction, construction activities, and post construction monitoring activities. During construction, there will be provisions in the contractor's agreement of works aligned to this Weed Management Plan. The following table (Table 4) is a guide for aggressive common species (adapted from Department of Agriculture and Food recommended techniques) and should be used as a guide to treat any infestations promptly. Further information for any species not listed in Table 4 should be gained from the Department of Agriculture and Food.

Table 4 – Weed Management Program

Species	Treatment
Grasses	
Kikuyu *Pennisetum clandestinum*	Control with herbicides whilst growing.
African Love Grass *Eragrostis curvulata*	Annual Spray during winter, small infestations all year round as required
Blowfly grass *Briza maxima*	Hand weed or spraying. Cool burn in late winter to spring before flowering.
Flat weed *Hypochaeris spp*	Annual Spray during winter, small infestations all year round as required
Barley Grass *Hordeum hystrix*	Prevent seed set for 1-2 years by hand removal. Spray with herbicides in winter.
Hare's-tail Grass *Lagurus ovatus*	Prevent seed set for 2-3 years by the removal of the topsoil through civil works
Annual Veldt Grass *Ehrharta longiflora*	Hand weed or use herbicides to prevent seed set for 2-3 years. In bushland situation herbicide treatment of Fusilade and spray oil or Fusilade plus spray oil and water should be applied in winter and repeated annually.
Woody Weeds	
Blackberry *Rubus ulmifolius*	Mechanical control difficult. Annual summer applications of Grazon, 3 applications required, use Glyphosate in sensitive areas (i.e. creeklines)
Ink weed *Phytolacca octandra*	Uproot heavy infestations and cut remaining plants 5cm below ground. Spraying is effective.
Herbs	
Common Sow Thistle *Sonchos oleraceus*	4L/ha 2,4_DB(400g/L) or 80mL 2,4_DB(400g/L) plues 25mL wetting agent in 10L of water for hand spraying will provide reasonably selective control when applied in June.
Cape Weed *Arctotheca calendula*	For large infestations apply Lontrel® 6 ml/10 L (300 ml/ha) in early growth stages. Glyphosate at 0.2% will provide some selective control if the plants are young or at the budding stage, otherwise spot spraying glyphosate at 10 ml/L will control at all growth stages.
Fat Hen *Chenopodium album*	Hand remove plants before seeding in summer. for herbicide control use 2,4-DB plus a wetting agent in 10L of water in early summer on young actively growing plants.
Ice plant *Mesembryanthemum crystallinum*	Hand remove isolated plants through spring and early summer. Herbicide treatment should also be applied throughout winter and early spring.
Spear thistle *Cirsium vulgare*	Manual removal or selective spray control
Night shade *Solanum nigrum*	Prevent seed set for several years. Hand remove plants before flowering and/or spray during the plant is growing in summer.
Fleabane *Conyza species*	Spray in late spring. Hand removal- remove taproot. Introduction of native species which provide shade.
Dolichos Pea *Dipogon lignosus*	Manual removal difficult. Burning not recommended. Spraying of Tordon until run-off in August annually.

Ref: Western Australian Herbarium (1998-) and Moore and Wheeler (2002).

Disclaimer

Note: The above herbicide treatments in Table 5 are direct quotes from Southern Weeds and their control (J.Moore and J.Wheeler, Department of Agriculture and Food WA.) and The Western Australia Herbarium (1998-) the control methods are based on using common cultural, biological and herbicidal control techniques. The reader should read the label of herbicides for further information, MSDS and registration status.

10.3 Management and Control of weeds

Initial management will be undertaken by Allsage Pty Ltd as part of the ongoing management of the subject site and road alignment construction. Advice will be given to the Shire from the Environmental Officer through regular inspections as per Table 2 for a period of 3 years post construction. Refer to Table 3 for Long Term Management Actions and timeframes.

Briefing information to site personnel will include but not be limited to:

- Maintain a weed free working environment through clean vehicles on entry to Lot 10792;
- Ensure weeds are not moved into weed-free areas through demarcation points and inspections;
- Show personnel physical samples of weeds present on site;
- Regular inspections of undercarriage of machines;
- Techniques of topsoil management to be modified if weeds are present via removing infected topsoils or spraying prior to soil disturbance; and
- Hand/mechanical removal of weeds to green waste.

11 Rehabilitation Management

Rehabilitation will be to constructed soils and a return to remnant vegetation. The rehabilitation areas will be clearly defined during road construction by the Project Manager with input from the Environmental Officer. The following objectives will apply to all rehabilitation works:

- To re-instate vegetation to continue the future biodiversity of the area;
- Assist naturally revegetating areas to return to pre-disturbed state;
- To establish vegetation through revegetation and regeneration of denuded areas with local endemic species through use of preserved topsoil;
- Brushing with adjacent vegetation types within the vegetation communities;
- To reduce weed invasions and competition of weeds with native species; and
- To assist with on the ground implementation of the revegetation.

11.1 Rehabilitation methods

- The method of revegetation is to use the seed from existing topsoil, brushing with adjacent vegetation and mulched remnant vegetation on site (from cleared areas);
- If seeding required, seed will be collected at appropriate seasons from adjacent vegetation and dispersed over constructed soils if required for further revegetation;
- Any weeds likely to significantly impact on the rehabilitation will be sprayed with Roundup or similar herbicide, or grubbed out, depending on the species involved. Refer to Weed Management Plan, Section 10; and
- Rehabilitation will be carried out promptly after soil disturbance.

11.2 Seed stock

Species shall be sourced from stockpiled topsoil, cleared/mulched native vegetation from clearing operations and seed/brush collection onsite (if required). Brush shall be collected and laid over any exposed areas to ensure that wind and water erosion does not occur. This is particularly successful in coastal sandy areas. If regeneration is slow then seed shall be collected at the first spring period and spread at the first Autumn rains (usually after three continuous rain days is recommended). It is anticipated that most species will regenerate from site topsoil (understorey and midstorey species).

11.3 Methodology

The revegetation methodology is proposed to be undertaken using the following steps:

1. Remove topsoil and place on regeneration area or store adjacent to the site (no more than 10m from removal area);
2. Store topsoil in piles no higher than 0.5m;
3. Spread topsoil over batters and regeneration areas of the track;
4. Ensure batters do not exceed 1:5m slopes;
5. Collect brush from adjacent species within road reserve (no longer than 1.5m and 2cm diameter) lay randomly over the revegetation area in a mixed fashion to stabilise the site and provide seed establishment;
6. Inspect site after first large rainfall event, re-lay any brush where required;
7. Inspect site after 6 months to determine success rate of revegetation and any weed establishment. Remove weeds either through selective spraying or hand removal;
8. Inspect site after 6 and 12 months to determine success rate of native plant establishment and any weed establishment. Remove weeds either through selective spraying or hand removal; and
9. Instigate any local species seed collection of required to “bulk out” revegetation areas.

11.4 Topsoil Management

Where topsoil removal is required, topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated. Where this is not possible the topsoil and overburden will be stored in low dumps (overburden and 0.5m for topsoil) for future use in rehabilitation.

No soil movement is to occur during rainfall or wet soil conditions. Operations are to cease and reviewed by the Environmental Officer and the Project Manager until dry soil conditions prevail.

12 Surface Water Management

The Shire of Northampton has requested that a Soil and Water Management Plan be prepared. As such this EMP does not detail any surface water management strategies. The Construction, Site and Project Managers should refer to the Management Plan prepared by AECOM for details on this matter.

General Stormwater checks are outlined in Section 5 of this report, with responsibilities outlined for the appointed Project Manager and Site Supervisor.

13 Fire Management

There is a potential fire risk from clearing operations in native vegetation on High/Very High/Extreme “Fire Danger Index” (FDI) rated days. The predominant fire risk associated with the site is the adjacent national park where heavily vegetated areas (Extreme Risks) under hot conditions can give rise to hot and intense fires. The following fire control methods should be enforced at all times during summer periods.

Fire control methods:

- Abide by Shire imposed Vehicle Movement and/or Harvest ban due to dangerous fire weather conditions or if there are bush fires already burning during the Restricted and Prohibited Burning Times (i.e. High-Very High Fire Danger days); and
- Maintain at all times minimum 30,000L of water in separate fire fighting tank for fire fighting purposes; and
- A mobile fire fighting appliance dedicated to fire fighting operations is located on the property at all times during summer operations.

Passing lanes and turnaround areas will be located in previously disturbed areas and maintained in perpetuity for fire management. Turn around areas and passing lanes should be designed to the technical standards as outlined within the Bushfire Management Plan (Bio Diverse Solutions 2015).

14 Timeline for implementation

The construction of the proposed Solar Station will be completed in two stages. The following timeframes for each stage are detailed below:

Stage 1:

- Design – August 2016 to November 2016;
- Approval Shire (anticipated) - November 2016;
- Shire Building License - January 2016;
- Approvals Western Power - December 2016;
- Financial Close - June 2017;
- Construction Start - March 2017;
- Commissioning - October/November 2017; and
- Operation - November / December 2017.

Stage 2:

- Western Power Tender - December 2016;
- Design – November 2016 to February 2017;
- Sire Construction Approval - June 2017;
- Connection Approvals WP - June 2017;
- Financial Close - September 2017;
- Construction Start - September 2017;
- Commissioning - July 2018; and
- Operation - August 2018.

It is recommended that this EMP is reviewed post construction stages with a site walk over with the Allsage Pty Ltd. Any factors which need to be considered for long term management should be documented into the updated EMP/post construction report.

At each stage/activity the management goals/objectives should be met prior to the next phase. Meetings between all members of the project group shall identify any environmental non-conformances. Meetings/briefings will be held weekly on site during the track construction period. The project group meetings shall be minuted and action items identified during each stage. It is anticipated that project meetings and site inspections could be more frequent during the construction phases as this is the period of highest risk for environmental harm to occur.

The goals and objectives for each stage have been clearly defined in Section 3 of this document, these are noted against each individual activity as identified prior to the commencement of this project.

15 Conclusion

Allsage Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Management Plan (EMP) for the construction of a solar thermal power station in the SE corner of the property and the associated road alignment to allow access to the solar farm from the west, partially using an existing road.

This Environmental Management Plan has been compiled to address legislative requirements and align best practise actions to implement the clearing of vegetation for construction of both the solar farm and the road alignment in an environmental, social and economically sustainable manner. The EMP aims to meet objectives of the development and environmental management actions to mitigate any adverse impacts on the natural environment.

Allsage Pty Ltd have given undertaking to commit to the procedures/actions outlined in this document through the documentation of this EMP Report and the appointment of an Environmental Officer (Kathryn Kinnear, Bio Diverse Solutions) to administer all pre, during construction, post construction and long term management recommended activities to ensure that the environmental objectives and protocols of this EMP are met and implemented.

This EMP aligns activities and responsibilities to pre-construction/vegetation clearing, during construction and post construction activities. The plan makes specific construction actions for Allsage Pty Ltd to align operational duties to the Project Manager, Environmental Officer, Site Supervisor and Machine Operators. The plan also documents the long-term maintenance and performance indicators for the site's environmental management post construction.

It is recommended post construction that any long term ongoing maintenance and management actions are included into an updated EMP or an operational procedures manual to guide any future owners of the subject site with regular communication to occur with the Environmental Officer regarding the site for a minimum period of 3 years post construction. The Environmental Officer will continue monitoring of the subject site formally and informally for a period of 3 years post construction. Should any aspect of the construction of the project change then it is recommended that this EMP plan be reviewed and the revision record updated.

It is further recommended by Bio Diverse Solutions that if this EMP is implemented as documented, then the construction of a Solar Thermal Power Station can be implemented sustainably and in an environmentally sound manner.

16 References

AECOM (2016) Proposed Solar Thermal Power Station - Kalbarri - Noise Management Plan. Unpublished report.

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Appendix A

Location Mapping

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Legend

- Solar Station
- Lot 10792
- Existing access track

Scale
1:15,000@ A3
MGA GDA 94 Zone 50

0 250 500 750 1,000 Meters

BIO DIVERSE SOLUTIONS
Unit 5A 209 Chester Pass Road
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575

CLIENT Tidal Energy Australia Pty Ltd
Lot 10792 George Grey Road
Kalbarri WA 6536

Location Mapping

STATUS	FILE	DATE
FINAL	WHEL033	11/01/2017

Appendix B

Department of Parks and Wildlife Correspondence

Lot 10792 George Grey Rd, Kalbarri.
Solar Farm and Wittecarra Creek Conservation Reserve

LEVEL 1 FLORA, VEGETATION AND FAUNA SURVEY

Kathryn Kinnear

Bio Diverse Solutions

12/11/2015

Contact details

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REVISION RECORD

Revision	Summary	Revised By	Date
DRAFT ID 2/10/2015	DRAFT INTERNAL QA REVIEW	K.BAIN & K.KINNEAR	2/10/2015
DRAFT ID 2/10/2015	DRAFT RELEASED TO CLIENT	V.BUTTERLY & B.ROURKE	2/10/2015
DRAFT ID 21/10/2015	REFERRED TO DPAW & DOW FOR COMMENT	N.DETCHON & M.CANNY	21/10/2015
FINAL ID 12/11/2015	UPDATED FROM DPAW COMMENTS	K.BAIN & K. KINNEAR	12/11/2015

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Site location

The survey area is located approximately 3.5 km south south west of Kalbarri and is a small portion of Lot 10792 George-Grey Drive, Kalbarri. This survey and report relate to a proposed 25 ha solar farm in the south east corner of the block and the 30.86 ha proposed Wittecarra Creek Conservation Reserve in the north west corner (Figure 1), which has been proposed to comply with provisions of the Shire of Northampton, Kalbarri Town Strategy (Shire of Northampton 2011).

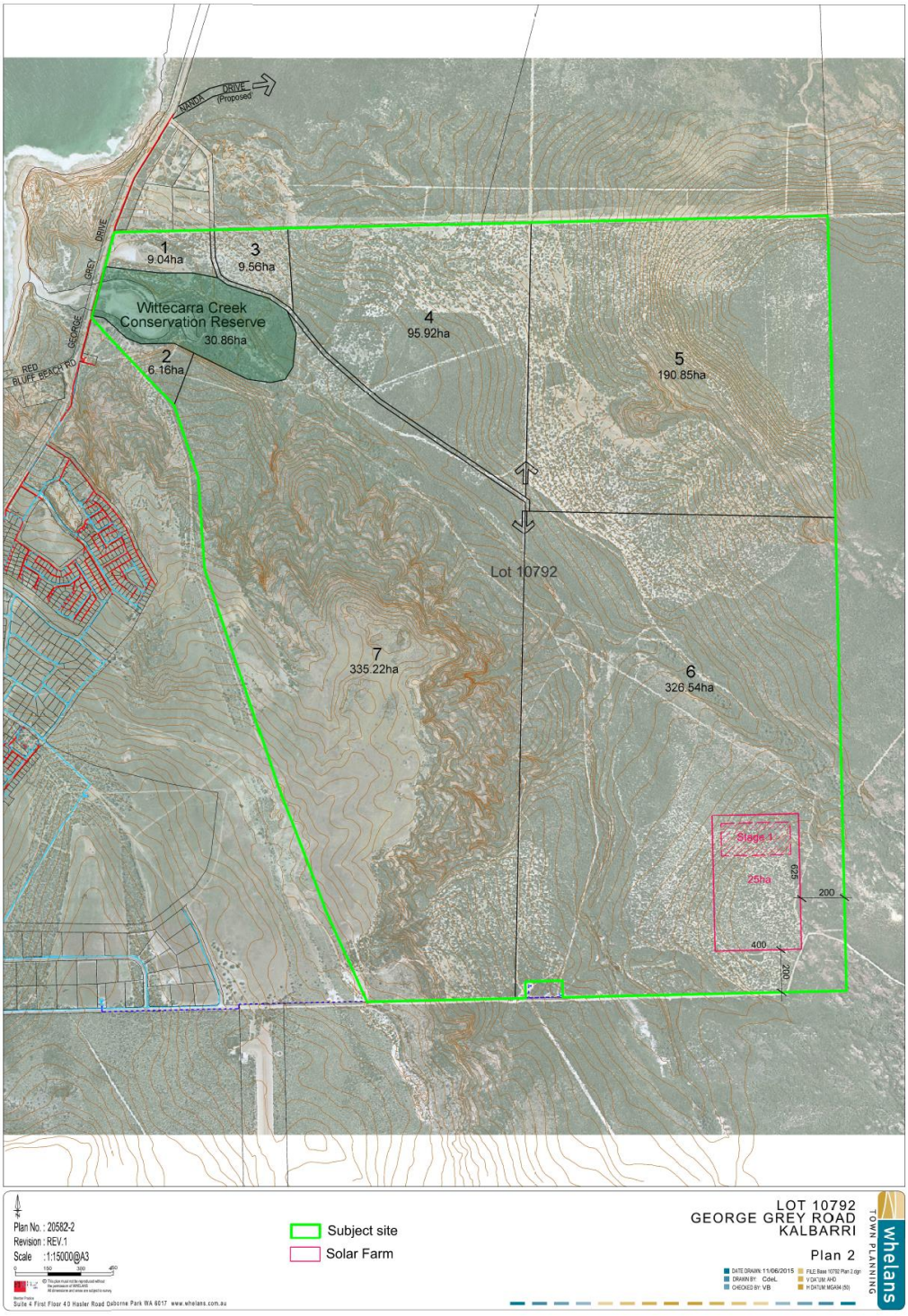


Figure 1: Location of Survey Area. Map Produced by Whelans Town Planning 11 June 2015.

To the south and east of the survey area is the Kalbarri National Park. To the west is public open space associated with the subdivision of Lot 9505. To the north is private land that has been earmarked for tourist attractions, conservation and groundwater protection (Shire of Northampton 2011).

1.2 Scope of work

Bio Diverse Solutions was commissioned by Allsage Pty Ltd (Brian Rourke), the owner of Lot 10792 to conduct a flora, vegetation and fauna assessment of a proposed solar farm in the SE corner of the property and a proposed conservation reserve around the mouth of the Wittecarra Creek, in the NW corner of the property. The proposed Wittecarra Creek Conservation Reserve boundary was considered indicative, with final boundaries to be determined from site investigations and environmental and landscape assessments (Shire of Northampton 2011). A proposed road alignment to allow access to the solar farm from the west, partially using an existing road, was also assessed during this survey.

A level 1 flora and vegetation survey was undertaken in accordance with EPA Guidance Statement 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004). The Level 1 fauna survey was undertaken in accordance with Guidance Statement 56: *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004b). Targeted surveys were also undertaken in potential habitat for Declared Rare Flora, priority listed flora, Threatened Ecological Communities, Threatened Fauna and priority listed flora. See section 2.1 and 3.1 for full desktop analysis and field survey methods.

1.3 Regional Context

The survey area lies within the Geraldton Sandplains Interim Biogeographic Regional Area (IBRA) bioregion and the Geraldton Hills sub region. The bioregion is characterised by extensive proteaceous heaths rich in endemic species occurring on undulating, lateritic sandplains (Desmond and Chant 2001). The Geraldton Hills subregion incorporates the southern end of Carnarvon Basin and northern end of the Perth Basin, with exposed areas of siltstone and sandstones, mostly overlain by sandplains, alluvial plains, and coastal limestones. Vegetation consists of heaths with emergent Banksia and Actinostrobus, York Gum woodlands on alluvial plains, proteaceous heath and *Acacia* scrubs on limestones and low closed forest of *Acacia* rostellifera on alluvial plains (Desmond and Chant 2001). The main land uses in the surrounding areas include residential development, dry land agriculture, grazing of native pastures, conservation lands, and other Crown lands.

1.4 Geology, geomorphology and soils

The survey area is located within the Kalbarri Sandplain Zone in the Canarvon Province, which is characterised by moderately dissected sandplain on deeply weathered mantle and colluvium over Cretaceous (and some Silurian) sedimentary rocks of the Carnarvon Basin (Tille 2006). The sandplains are predominantly flat to gently undulating, though sandplains with linear (and occasionally reticulate) dunes and broad depressions also occur. The floors of these depressions may be broad sandy swales, clayey interdunal plains, saline flats, or limestone plains. Alluvial plains are found on old river deltas and range from nearly flat, saline plains to plains with numerous low sandy banks and rises. Soils are dominated by pale deep sands, yellow deep sands, red deep sands and sandy duplexes, some pale shallow sands and bare rock (Tille 2006).

2 VEGETATION AND FLORA

2.1 Survey methods

Desktop inventory of potential threatened flora species likely to occur within 5km of the survey area was undertaken using the following databases:

- Formal search of DPaW Threatened and Priority Flora database (Appendix A);
- Nature Map Database Search (combined data from DPaW, WA Museum and WA Herbarium) (DPaW 2015 Appendix B);
- Protected matters search tool (DoE 2015, Appendix C); and
- WA Herbarium records accessed through Flora Base (Western Australian Herbarium, DPaW)

The list compiled from this data is based on observations from a broader area than the survey area and is likely to include species that would not occur in the actual survey area due to a lack of suitable habitat. The data also includes very old records and in some cases the species in question may have become locally or regionally extinct.

The conservation significance of flora species has been assessed using data from the following sources:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Administered by the Australian Government Department of the Environment (DoE);
- Wildlife Conservation Act 1950 (WC Act). Administered by the Western Australian Department of Parks and Wildlife (DPaW);
- DPaW Priority Flora list. A non-legislative list maintained by DPaW for management purposes.

Karlene Bain, a botanist from Bio Diverse Solutions undertook a level 1 flora and vegetation survey on 16 and 17 September 2015. The survey area was traversed on foot. The flora was systematically recorded and collections of plant specimens were made where further identification was required. For species that were not flowering and where foliage or nuts/ fruit couldn't be used for identification, potential habitat was used as an indication of the likelihood of species occurrence.

The plant communities occurring within the survey area were mapped and described in detail using opportunistic mapping and collections as well as 12 quadrats (10m x 10m) in the solar farm area and 17 quadrats in the proposed Wittecarra Creek Conservation Reserve. Quadrats were positioned in a manner that was representative of the different vegetation units onsite and their varying condition.

2.2 Flora survey outcomes

A search of the DPaW Threatened Flora Database (DEFL), the WA Herbarium database (WAHerb), the Declared Rare and Priority Flora Species List (TFPL), Naturemap and the Protected Matters Search Tool identified 112 species of declared rare and priority listed flora within a 5km radius of the site, including 10 DRF and 102 priority listed species (Table 1). Of these species, 38 were considered unlikely to occur within the survey area as a result of unsuitable habitat. Suitable habitat was present onsite for the remaining 74 species, but despite targeted searches only one species was found during field surveys, *Chamelaucium marchantii* (P3).

During the field survey 88 species, consisting of 29 families and 66 genera were found. The most common families were Myrtaceae, Fabaceae, Poaceae and Asteraceae. This list includes 75 native species (Table 2 and 3) and seven introduced species (Table 5).

Table 1: Potential Threatened Flora Species Occurring Within 5 km of Lot 10792 George-Grey Rd, Kalbarri. Generated from Nature Map (DPaW 2015), Protected Matters Search Tool (DOE 2015) and the DPaW Threatened and Priority Flora database with a post hoc assessment of suitability of habitat and flowering

Species	Status (WA)	Potentially Suitable Habitat	Within Flowering Period
Acacia gelasina	P2	Y	Y
Acacia leptospermoides subsp. obovata	P2	Y	Y
Acacia plautella	P3	Y	Y
Acacia stereophylla var. cylindrata	P2	Y	Y
Acanthocarpus parviflorus	P3	Y	N
Angianthus microcephalus Small-headed Angianthus	P2	Y	Y
Anthocercis intricata	P3	Y	Y
Anthotroche myoporoides	P3	Y	Y
Arnocrinum drummondii	P3	Y	Y
Astroloma inopinatum	P1	N	N
Baeckea subcuneata	P2	Y	Y
Beyeria cinerea subsp. cinerea	P3	Y	N
Beyeria gardneri	P3	Y	Y
Beyeria lepidopetala Short-petalled Beyeria	DRF	Y	Y
Bossiaea calcicola	P3	N	Y
Bossiaea inundata	P2	Y	Y
Caladenia barbarella	EN	N	Y
Caladenia bryceana subsp. cracens	EN	N	Y
Caladenia hoffmanii	EN	Y	Y
Caladenia wanosa Kalbarri Spider Orchid	EN	Y	Y
Calectasia browneana	P2	N	Y
Calothamnus cupularis	P2	Y	N
Calytrix formosa	P3	Y	Y
Calytrix harvestiana	P2	Y	Y
Calytrix paucicostata	P2	Y	Y
Calytrix pimeleoides	P3	Y	Y
Calytrix purpurea	P2	Y	Y
Carpobrotus sp. Thevenard Island (M. White 050)	P3	N	Y
Centrolepis cephaloformis subsp. murrayi	P3	Y	Y
Chamelaucium marchantii	P3	Y	Y
Chthonocephalus tomentellus	P2	N	Y
Cryptandra glabriflora	P2	Y	N
Dampiera sp. Jurien (G. Lullfitz s.n. 10/7/1986)	P2	N	N
Desmocladus biformis	P3	Y	Y
Diuris recurva	P4	N	N
Drakaea concolor	EN	Y	Y
Enekbatus cristatus	P2	Y	Y
Eremophila microtheca	P4	N	Y
Eremophila occidens	P2	N	Y
Eucalyptus arachnaea subsp. arrecta	P3	Y	N
Eucalyptus beardiana	EN	Y	Y
Frankenia confusa	P4	N	Y
Geleznowia sp. Red Bluff (A. Crawford ADC 597) PN	P2	Y	Y
Grevillea costata	P3	N	Y

Table 1 continued

Species	Status (WA)	Potentially Suitable Habitat	Within Flowering Period
Grevillea leucoclada	P3	N	Y
Grevillea rogersoniana	P3	N	Y
Grevillea stenomera Lace Net Grevillea	P2	Y	Y
Guichenotia impudica	P3	N	Y
Harperia ferruginipes	P1	N	N
Hemiandra sp. Kalbarri (D. Bellairs P1505)	P2	Y	Y
Hibbertia spicata subsp. leptotheca	P3	N	Y
Hypocalymma angustifolium subsp. Hutt River (S. Patrick P298P2)	VU	Y	Y
Jacksonia velutina	P4	Y	Y
Lasiopetalum oldfieldii subsp. oldfieldii	P3	Y	Y
Lasiopetalum oppositifolium	P3	N	Y
Lechenaultia chlorantha	EN	Y	Y
Lechenaultia chlorantha Kalbarri Leschenaultia	EN	Y	Y
Lepidobolus densus	P3	N	N
Lepidosperma rupestre Kalbarri Lepidosperma	P4	N	N
Macarthuria intricata	P3	N	Y
Malleostemon sp. Hardabutt Rapids (D. Bellairs P165P4A)	P1	N	N
Malleostemon sp. Kalbarri (L.A. Craven 708P3)	P2	Y	N
Malleostemon sp. Moonyoonooka (R.J. Cranfield P29P47)	P2	N	Y
Malleostemon sp. Yerina (S.J. Patrick 2728)	P1	N	N
Melaleuca boeophylla	P2	Y	N
Melaleuca oldfieldii	P2	N	N
Microcorys tenuifolia	P3	N	N
Micromyrtus collina	P1	Y	N
Millotia jacksonii	P2	Y	Y
Mirbelia corallina	P3	Y	Y
Murchisonia fragrans	P2	Y	Y
Paracaleana alcockii	P2	Y	Y
Persoonia brachystylis Short-styled Persoonia	P2	Y	N
Philotheca kalbarriensis	P2	Y	Y
Physopsis chrysophylla	P3	Y	Y
Pileanthus aurantiacus	P1	Y	N
Pileanthus bellus	P3	Y	N
Pityrodia viscida	P4	N	Y
Platysace sp. Kalbarri (D. & B. Bellairs 1383)	P2	Y	N
Scaevola kallophylla	P4	N	Y
Scaevola oldfieldii	P3	Y	Y
Scaevola sp. Golden hairs (D. & B. Bellairs 1450 A)	P1	Y	N
Schoenus sp. Kalbarri (K.R. Newbey 9P35P2)	P2	Y	Y
Scholtzia sp. Ajana (T.A. Halliday P1P37)	P3	Y	Y
Scholtzia sp. Eradu (R.D. Royce 8016)	P2	Y	N
Scholtzia sp. Eurardy (J.S. Beard 6886)	P2	N	N
Scholtzia sp. Folly Hill (M.E. Trudgen P1P2097)	P2	Y	Y
Scholtzia sp. Kalbarri	P2	N	Y

Table 1 Continued

Species	Status (WA)	Potentially Suitable Habitat	Within Flowering Period
Scholtzia sp. Ross Graham Lookout (S. Maley 6)	P2	Y	Y
Scholtzia sp. Z-Bend (Bellairs-Kalflora 9P1P2a)	P2	Y	N
Stachystemon nematophorus	P4	Y	Y
Stenanthemum divaricatum	P3	Y	Y
Thryptomene calcicola	P2	Y	N
Thryptomene johnsonii	P2	Y	Y
Thryptomene sp. Eagle Gorge (A.G. Gunness 2360)	P2	N	N
Thryptomene sp. Wandana (M.E. Trudgen MET P2P20P16)	P3	Y	Y
Thryptomene stenophylla	P2	Y	N
Thryptomene striata	P2	Y	Y
Thysanotus sp. Kalbarri (D. & B. Bellairs 1523 A)	P2	Y	Y
Triodia bromoides	P4	N	Y
Triodia dielsii	P3	N	Y
Verticordia capillaris	P4	Y	Y
Verticordia cooloomia	P3	Y	Y
Verticordia dasystylis subsp. kalbarriensis	P2	N	N
Verticordia densiflora var. roseostella	P3	N	Y
Verticordia dichroma var. dichroma	P3	Y	Y
Verticordia dichroma var. syntoma	P3	Y	N
Verticordia galeata	P2	N	Y
Verticordia polytricha N.Cauliflower	P4	Y	Y
Verticordia x eurardyensis	P1	Y	N
Wurmbea murchisoniana	P4	N	Y

A full listing of conservation codes are provided in Appendix G.

Table 2: Native Flora Species Recorded from the Solar Farm Survey Area on Lot 10792

Family	Species	Common Name
Araliaceae	*Trachymene ornata*	Spongefruit
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Asteraceae	*Calocephalus francisii*	Fine-leaf Beauty-heads
Asteraceae	*Gnephosis tenuissima*	
Asteraceae	*Helipterum craspedioides*	Yellow Billy Buttons
Asteraceae	*Lawrencella rosea*	
Asteraceae	*Olearia axillaris*	Coastal Daisybush
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Asteraceae	*Pogonolepis stricta*	
Casuarinaceae	*Allocasuarina campestris*	
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Ericacea	*Leucopogon cordifolius*	Heart-leaf Beard heath
Ericaceae	*Astroloma glaucescens*	
Fabaceae	*Acacia oldfieldii*	
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Jacksonia cupulifera*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Fabaceae	Leptosema aphyllum	
Goodeniaceae	*Goodenia berardiana*	
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Lamiaceae	*Lachnostachys eriobotrya*	Lambswool
Myrtaceae	*Baeckea robusta*	
Myrtaceae	*Calothamnus quadrifidus ssp homalophyllus*	Murchison Claw Flower
Myrtaceae	*Calytrix brevifolia*	
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Myrtaceae	*Thryptomene denticulata*	
Poaceae	*Austrostipa nitida*	
Polygalaceae	*Comesperma scoparium*	Broom Milkwort
Polygonaceae	*Muehlenbeckia adpressa*	Climbing Lignum
Portulaceae	*Calandrinia ployandra*	Parakeelya
Proteaceae	*Banksia prionotes*	Acorn Banksia
Proteaceae	*Conospermum stoechadis*	Common Smokebush
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Proteaceae	*Grevillea pinaster*	
Proteaceae	*Hakea orthorrhyncha*	Bird Beak Hakea
Restionaceae	*Desmocladus asper*	
Solanaceae	*Solanum lasiophyllum*	Flannel Bush
Stylidiaceae	*Stylidium sp. Kalbarri*	

* refers to species that are alien to Western Australia.

Table 3: Native Flora Species Recorded from the Proposed Conservation Reserve on Lot 10792

Family	Species	Common Name
Aizoaceae	*Gunniopsis septifraga*	
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Amaranthaceae	*Ptilotus polystachyus*	Prince of Wales Feather
Araliaceae	*Trachymene ornata*	
Asparagaceae	*Acanthocarpus sp. Ajana*	
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Asteraceae	*Arctotheca calendula**	Cape Weed
Asteraceae	*Calocephalus francisii*	Fine-leaf Beauty-heads
Asteraceae	*Sonchos oleraceus**	Common Sow Thistle
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Chenopodium album**	Fat Hen
Chenopodiaceae	*Enchylaena tomentosa*	Barrier Saltbush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Chenopodiaceae	*Rhagodia preissii subsp. obovata*	
Chenopodiaceae	*Tetricornia halocnemoides*	Red Samphire
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Crassulaceae	*Crassula colorata*	
Dilleniaceae	*Hibbertia spicata*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Fabaceae	*Melilotus indicus**	
Goodeniaceae	*Dampiera spicigera*	Spiked Dampiera
Haemodoraceae	*Conostylis robusta*	
Haemodoraceae	*Conostylis stylidioides*	
Lauraceae	*Cassytha aurea var. aurea*	
Loranthaceae	*Amyema linophylla subsp. linophylla*	
Malvaceae	*Commersonia densiflora*	
Malvaceae	*Lasiopetalum sp.*	
Myrtaceae	*Baeckea pentagonantha*	
Myrtaceae	*Calothamnus sanguineus*	Silky-leaved Blood flower
Myrtaceae	*Chamelaucium marchantii (P3)*	
Myrtaceae	*Eucalyptus camaldulensis subsp. obtusa*	Blunt-budded River Red Gum
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark
Poaceae	*Austrostipa macalpinei*	
Poaceae	*Austrostipa nitida*	
Poaceae	*Ehrharta longiflora**	
Poaceae	*Eriachne aristidea*	
Poaceae	*Hordeum hystrix**	Barley Grass

Table 3 Continued

Family	Species	Common Name
Poaceae	*Parapholis incurva*	Coast Barb Grass
Poaceae	*Rostraria cristata*	
Polygalaceae	*Comesperma scoparium*	Broom Milkwort
Polygonaceae	*Muehlenbeckia adpressa*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Banksia menziesii*	Firewood Banksia
Proteaceae	*Banksia prionotes*	Acorn Banksia
Solanaceae	*Anthocercis ilicifolia subsp. caldariola*	

* refers to species that are alien to Western Australia.

2.3 Vegetation Units

Vegetation units were mapped in the field using a GPS and as 12 quadrats (10m x 10m) in the solar farm area and 17 quadrats in the proposed conservation reserve (see Appendix D for a map and full list of species associated with each plot). Eight main vegetation units were identified within the survey area (Figure 2, 3 and Table 4).

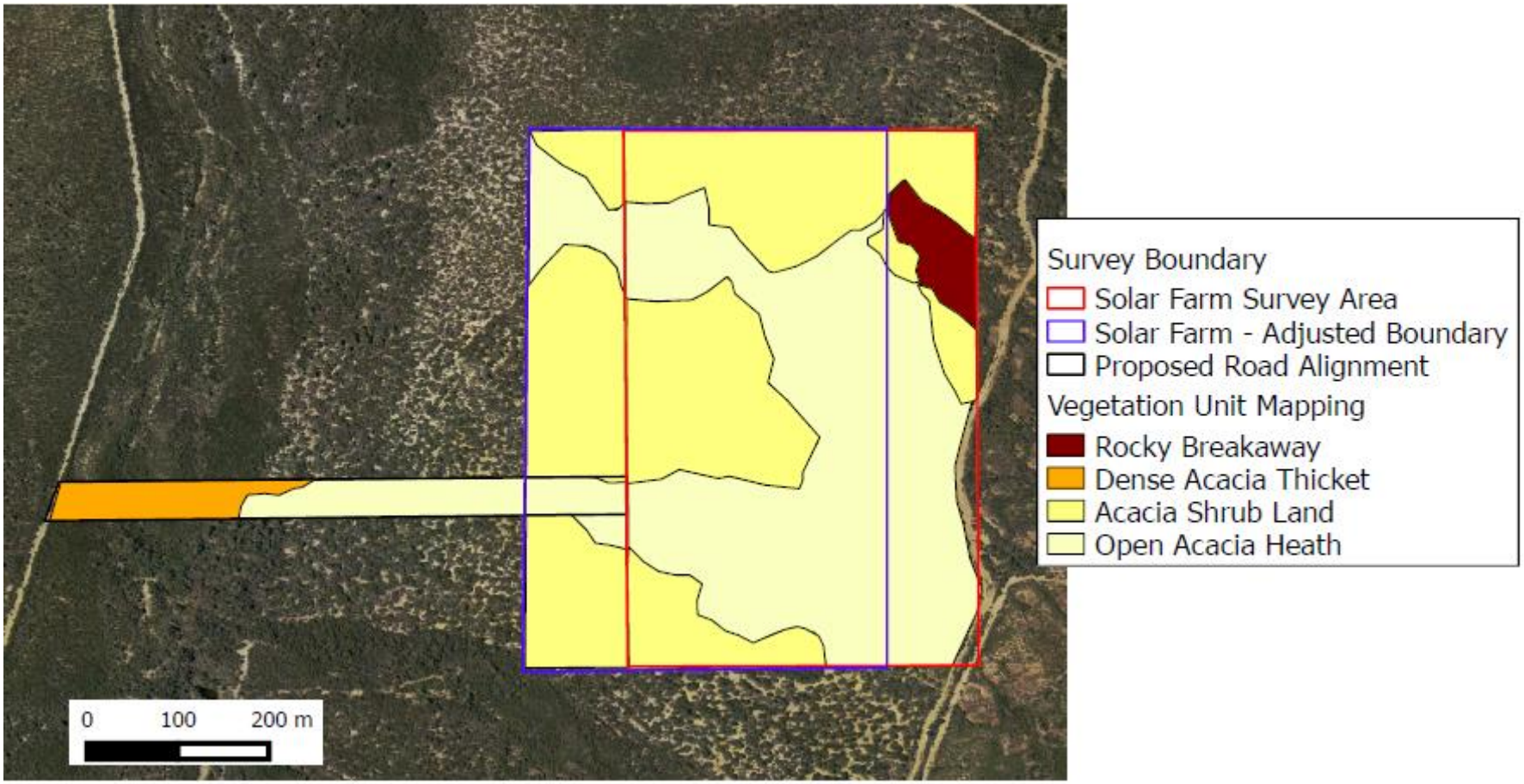


Figure 2: Vegetation Units Mapped Within the Solar Farm and Proposed Road Alignment Survey Areas on Lot 10792 George Grey Rd, Kalbarri.

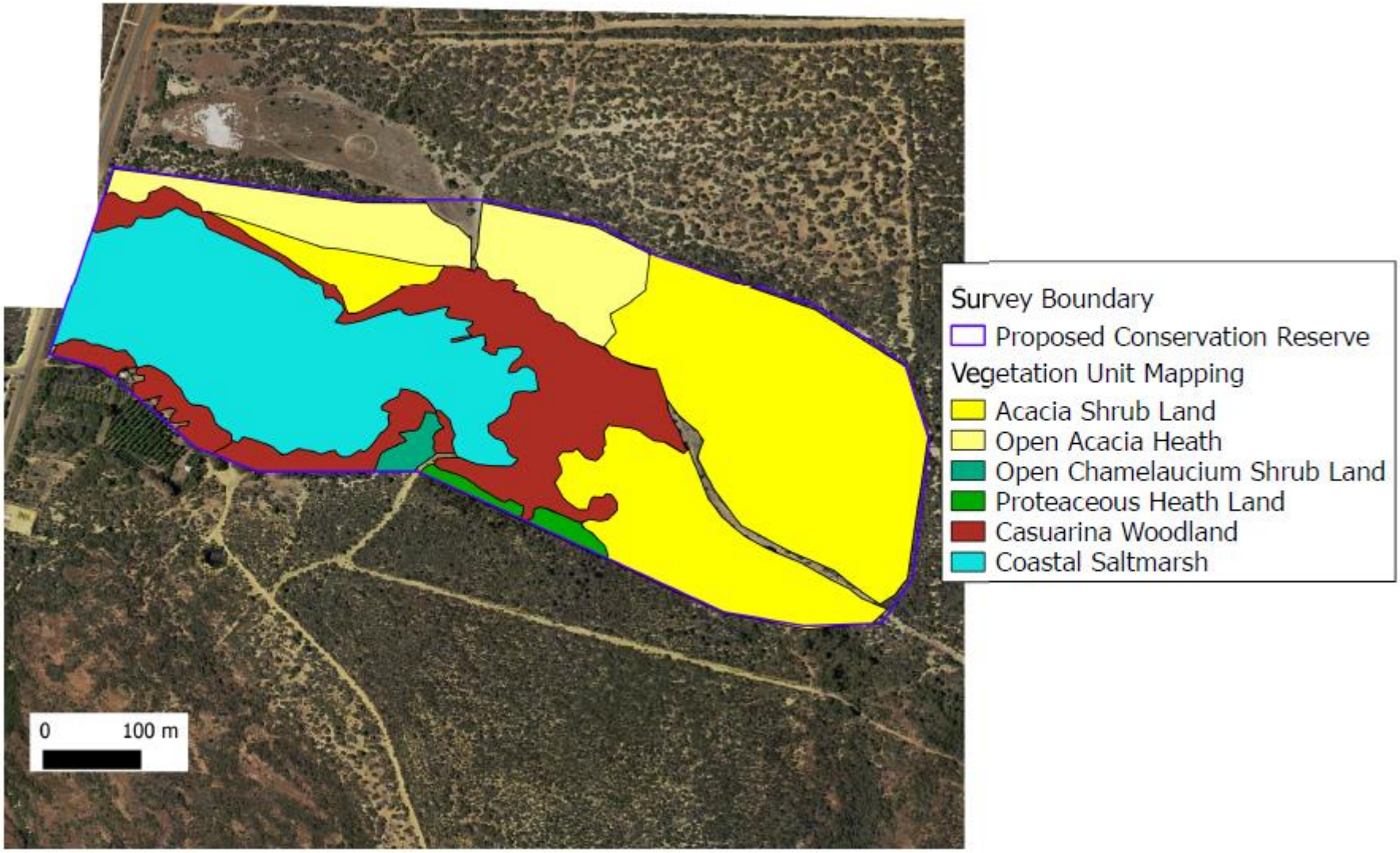
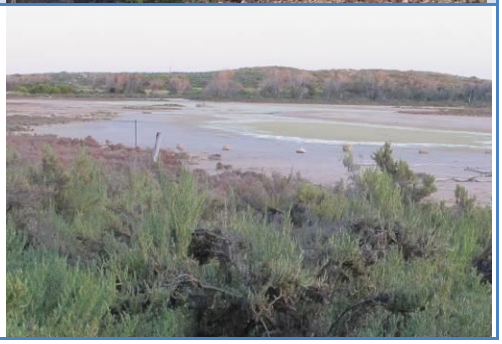


Figure 3: **Vegetation Units Mapped Within the Proposed Wittecarra Creek Conservation Reserve on Lot 10792 George Grey Rd, Kalbarri.**

Table 4: Description Of Vegetation Units Mapped Within the Solar Farm Area, Proposed Conservation Reserve and Proposed Road Alignment on Lot 10792 George Grey Rd Kalbarri.

Vegetation Unit Description	Image
Tall *Acacia* shrub land on deep yellow sand. 50-90% cover; 3-7 m high. Overstorey of *Acacia oldfieldii or Acacia scirpifolia, Labichea lanceolata, Jacksonia cupulifera, Allocasuarina campestris, Callitris arenaria, Grevillea leucopteris* and *Banksia prionotes* (occasional)*; understorey of Baeckea robusta, Melaleuca megacephala, Solanum lasiophyllum*, *Lachnostachys eriobotrya* and *Scholtzia sp. Red Bluff*; and a sparse ground cover of *Calandrinia polyandra*, *Trachymene ornata, Podotheca gnaphliodes*, *Arctotheca calendula*, Goodenia berardiana, Ehrharta longifolia*, Austrostipa nitida* and *Schenkia australis.* In the proposed conservation reserve, this vegetation unit also included *Acacia rostellifera, Anthocercis ilicifolia subsp. caldariola, Atriplex amnicola, Rhagodia latifolia subsp latifolia, Acacia rostellifera, Austrostipa macalpinei* and *Eriachne aristada.*	
Dense *Acacia* Thicket 5-8 m tall. Dense thickets of *Acacia sicrpifolia, Melaleuca megacephala, Labichea lanceolata, Grevillea leucopteris* and *Jacksonia cupulifera.* Understorey of *Gompholobium tomentosum*, *Patersonia occidentalis var. latifolia* (occasional), *Stylidium sp. Kalbarri, Calandrinia ployandra* and *Comesperma scoparium*.	
Sparse *Calothamnus* over red sandstone breakaways. 0.8-2m high; Overstorey of *Calothamnus quadrifidus ssp homalophyllus, Hakea orthorrhyncha, Scholtzia* sp. Red Bluff, *Jacksonia cupulifera* and *Grevillea pinaster*; Understorey of *Thysanotus manglesianus*; ground cover of *Calandrinia polyandra*, *Calocephalus francisii*, *Podotheca gnaphalioides, Calocephalus francisii, Gnephosis tenuissima, Helipterum craspedioides* and *Pogonolepis stricta*	
Low, open *Acacia* heath land 0.8-3 m high over deep yellow sand. Overstorey dominated by *Acacia oldfieldii, Acacia scirpifolia, Labichea lanceolata, Olearia axillaris, Calothamnus quadrifidus ssp homalophyllus, Melaleuca megacephala, Allocasuarina campestris*, *Calytrix brevifolia, Grevillea leucopteris* and *Callitris arenaria* (occasional); understorey dominated by *Thysanotus manglesianus,* Leptosema aphyllum, *Comesperma scoparium, Solanum lasiophyllum, Glischrocaryon aureum, Thryptomene denticulata* (occasional) and *Astroloma glaucescens* (occasional); and sparse ground cover of *Trachymene ornata, Podotheca gnaphliodes, Gnephosis tenuissima, Muehlenbeckia adpressa, Arctotheca calendula*, Stylidium sp. Kalbarri, Calandrinia polyandra* and *Desmocladus asper.*	

Table 4 continued

Vegetation Unit Description	Image
Open Chamelaucium shrub land. Overstorey of *Chamelaucium marchantii* (P3), *Calothamnus sanguineus, Melaleuca megacephala Acacia rostellifera, Acacia scirpifolia, Banksia menziesii* and *Anthocercis ilicifolia subsp. caldariola;* understorey of *Ptilotus polystachyus, Rhagodia latifolia subsp latifolia, Hibbertia spicata, Dampiera spicigera* and *Austrostipa macalpinei;* ground cover of *Calocephalus francisii* and *Calandrinia polyandra.*	
Proteaceous heath on deep yellow sand. Overstorey dominated by *Banksia menziesii, Banksia prionotes, Anthocercis ilicifolia subsp. caldariola, Acacia rostellifera, Acacia scirpifolia, Labichea lanceolata, Calothamnus sanguineus* and *Melaleuca megacephala.* Understorey dominated by *Ptilotus polystachyus, Dampiera spicigera, Conostylis robusta, Conostylis stylidioides, Commersonia densiflora, Cassytha aurea var. aurea, Lasiopetalum sp., Austrostipa macalpinei, Austrostipa nitida, Eriachne aristada* and *Comesperma scoparium;* ground cover dominated by *Trachymene ornata*, *Calocephalus francisii* and *Calandrinia polyandra.*	
Tall *Casuarina* woodland over brown loamy sand. Overstorey dominated by *Casuarina obesa* and *Eucalyptus camaldulensis subsp. obtusa;* with some *Amyema linophylla subsp. linophylla* on the Casuarina. No understorey within the undisturbed true woodland areas; a weedy understorey adjacent to the farm area on the southern boundary of the proposed reserve. On the fringes of the woodland, a sparse understorey of *Atriplex amnicola, Rhagodia latifolia subsp latifolia, Cassytha aurea var. aurea, Tetricornia indica ssp. bidens* and *Enchylaena tomentosa*	
Coastal Saltmarsh. Complete absence of overstorey or understorey. Vegetation interspersed with unvegetated patches and salt pans. Ground cover dominated by succulent species: *Tetricornia indica ssp. bidens* and *Tetricornia halocnemoides.* Other species present include: *Gunniopsis septifraga, Mesembryanthemum crystallinum*, Arctotheca calendula*, Crassula colorata, Hordeum hystrix*, Parapholis incurva, Rostraria cristata* and *Enchylaena tomentosa (occasional)*	

2.4 Vegetation Condition

The vegetation condition for the survey area has been surveyed using the Keighery condition rating scale (Keighery 1994, Appendix E). Vegetation in both the proposed solar farm and road alignment survey areas was in "Excellent condition" throughout, with a weed index of between 0 and 5% across these areas (not mapped as deemed "Excellent condition" throughout survey area).

Within the proposed Wittecarra Creek conservation reserve, disturbance to the vegetation was more evident as a result of significant 4WD and motorcycle access to the area, particularly around the wetland area where multiple tracks had been established. It was unclear why visitation to this area is so high, but the outcome has been the physical disturbance of vegetation proximate to these tracks and the lake, dumping of rubbish within these areas and weed invasion from the tracks and from a mango farm south of the lake. Areas of proteaceous heath, *Chamelaucium* heath and *Acacia* shrub land located away from the core wetland area are in excellent-pristine condition (Figure 4).

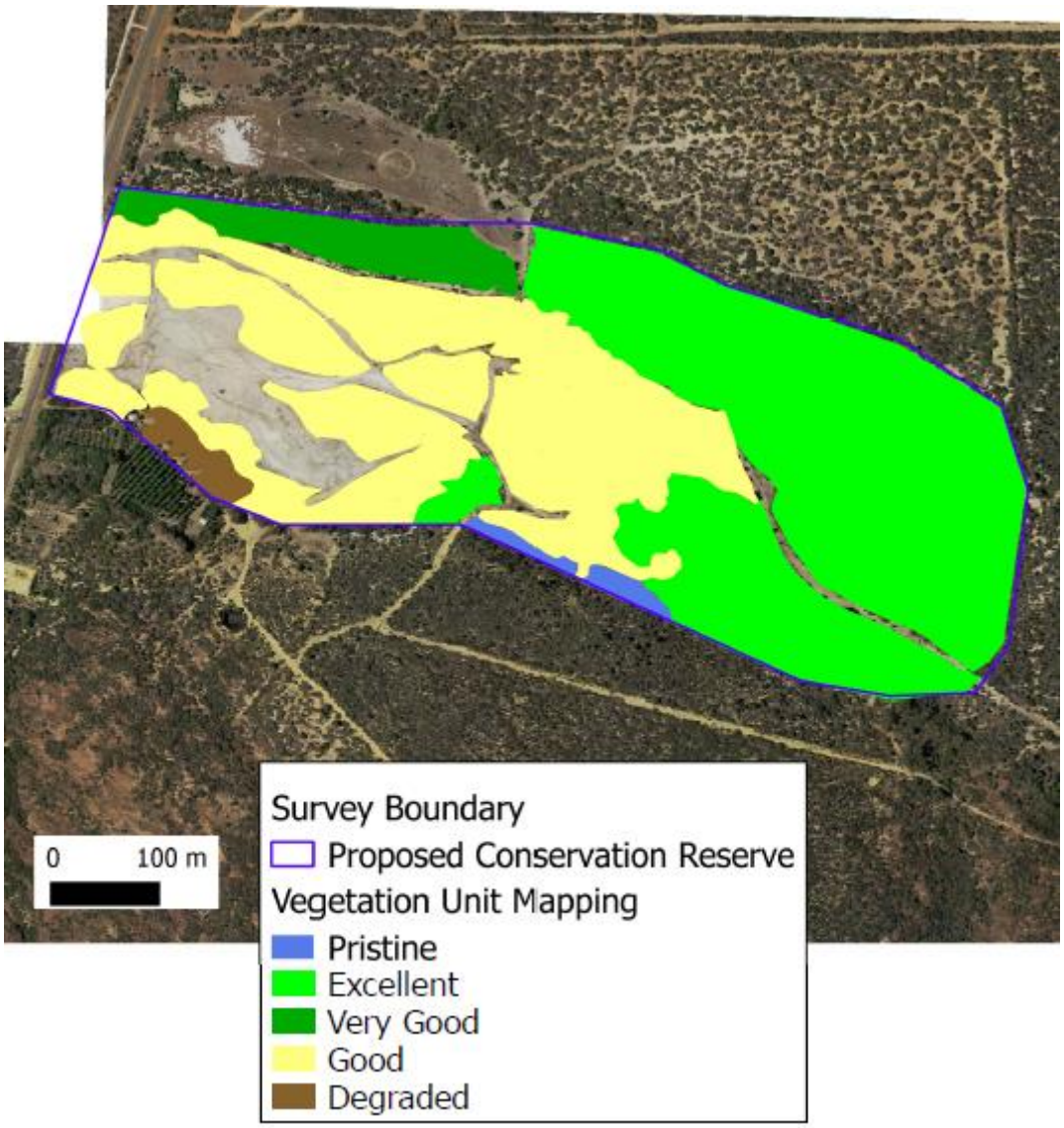


Figure 4: Vegetation Condition Mapped Within the Proposed Wittecarra Creek Conservation Reserve in Lot 10792 George Grey Rd, Kalbarri.

2.5 Weeds and disturbance

Of the 88 taxa recorded within the survey area, seven (8 %) were introduced species (Table 5).

Table 5: Weed species recorded from within the two survey areas on Lot 10792

Family	Species	Common Name	BAM Rating	EWS Rating
Aizoaceae	*Mesembryanthemum crystallinum*	Ice plant	None	Mod
Asteraceae	*Arctotheca calendula*	Cape Weed	None	Mod
Asteraceae	*Sonchos oleraceus*	Common Sow Thistle	None	None
Chenopodiaceae	*Chenopodium album*	Fat Hen	None	Low
Fabaceae	*Melilotus indicus*		None	TBA
Poaceae	*Ehrharta longiflora*		None	Mod
Poaceae	*Hordeum hystrix*	Barley Grass	None	None

The most extensively weed invaded areas were associated with the 4WD access to areas fringing the Witteccarra Creek wetland,and garden escapes from a small farm on the southern edge of the wetland. In these areas, weed cover contributed between 10-80% of the understorey and reduced condition of the vegetation. In the remaining areas (>90% of the survey area), the weed index was very low, with < 10% cover.

Of the weeds recorded, none are declared agricultural weeds under the *Biosecurity and Agriculture Management Act 2007* and none are considered a high priority for control and/or research as identified in the Environmental Weeds Strategy for Western Australia (CALM 1999). The strategy classifies weeds according to their relative level of threat to conservation (high medium or low) and this rating is based their relative level of invasiveness, distribution and environmental impacts (Appendix F).

Other disturbances in the reserve included 4WD access through and around the wetland, rubbish dumping and minor firewood cutting within the *Casuarina* woodland.

3 FAUNA

3.1 Survey methods

Desktop inventory of potential threatened fauna species likely to occur within 10 km of the survey area was undertaken using the following databases:

- DPaW's Nature Map Database Search (combined data from DPaW, Western Australian Museum and Birds Australia) (DPaW 2015, Appendix B); and
- Protected matters search tool (DoE 2015, Appendix C).

The list compiled from this data is based on observations from a broader area than the survey area and is likely to include species that are vagrants or would not occur in the actual survey area due to a lack of suitable habitat or poor ecological connectivity. The databases also often included very old records and in some cases the species in question may have become locally or regionally extinct.

The conservation significance of fauna species has been assessed using data from the following sources:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Administered by the Australian Government Department of the Environment (DoE);
- Wildlife Conservation Act 1950 (WC Act). Administered by the Western Australian Department of Parks and Wildlife (DPaW);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- DPaW Priority Fauna list. A non-legislative list maintained by DPaW for management purposes.

The EPBC Act also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA). Species listed under JAMBA are also protected under Schedule 3 of the WC Act;
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the Project area has been assessed using the most recent lists published in accordance with the above-mentioned instruments and is indicated as such in the fauna listings of this report. Full definitions of conservation codes are provided in Appendix G.

A number of other species not listed in official lists can also be considered of local or regional conservation significance. These include species that have a restricted range, those that occur in breeding colonies and those at the limit of their range.

It can be difficult to identify what may be significant invertebrate species in Western Australia (e.g. Short Range Endemics - SREs) as there is a lack of knowledge on invertebrates, there is currently no general standard for invertebrate survey work and there is a shortage of invertebrate taxonomic expertise (Harvey 2002). For this survey, the assessment for conservation significant invertebrates has been limited to those listed by the DPaW and *EPBC Act* database searches (which rely on distribution records and known habitat preferences).

Field survey work was carried out by an experienced zoologist Karlene Bain (Bio Diverse Solutions) on the 16 and 17 September 2015. Vegetation units observed during the site survey were used to define broad fauna habitat types across the site (See section 2.3, Figure 2, 3 and Table 4). The main aim of the habitat assessment was to determine the likelihood of threatened species utilising the area and the significance of the habitat to them.

Opportunistic observations of fauna species were made during survey of 29 vegetation quadrats across the survey areas (12 in the proposed solar farm area and 17 in the proposed Wittecarra Creek Conservation Reserve). In addition, microhabitats such as logs, rocks, leaf litter and standing water were searched throughout the site, frogs were identified from their calls or through direct observation and bird species were identified from their calls or from visual identification through binoculars.

Targeted assessment was carried out for threatened species, migratory species that are recognised under international treaties, short range endemics and species of local significance that were identified in the desktop inventory. Assessment techniques used for each species are summarised in Table 6.

No seasonal sampling was conducted during this fauna assessment. The conclusions presented are based upon opportunistic field data collected over a limited period of time and are indicative of the environmental condition of the site at the time. Some fauna species are reported as potentially occurring within the study area based on the presence of suitable habitat (quality and extent) within the study area or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to seasonal inactivity during the field survey, species present within micro habitats not surveyed, cryptic species able to avoid detection and transient wide-ranging species not present during the survey period. Lack of observational data on some species should therefore not necessarily be taken as an indication that a species is absent from the site.

3.2 Fauna Survey Outcomes

A search of the DPaW Threatened Fauna Database (DEFL), Naturemap and the Protected Matters Search Tool identified 105 species of threatened, priority listed or specially protected fauna within a 10 km radius of the site, including 39 threatened species, six priority listed species and 60 migratory species that are recognised under international treaties (Appendix B, C). Of these species, 85 were considered unlikely to occur within the survey area as a result of unsuitable habitat, for example migratory marine species. Suitable habitat was present onsite for the remaining 20 species.

Targeted surveys and assessment of habitat suitability were undertaken for the 20 species identified as potentially occurring within the survey area. Results are presented in Table 6. The solar farm area was found to contain evidence of Tammar Wallaby (*Macropus eugenii subsp. derbianus*) in the form of old faecal material. The scats were well-weathered and there was no evidence of fresh activity. The location of the old activity was on the eastern boundary associated with dense *Acacia* shrub land and close to the Kalbarri National Park. Tammar Wallabies were reintroduced into the Kalbarri National Park in 2010 and public sightings and DPaW records suggest that the population is persisting in the area. These animals are at risk from predation by feral animals such as the Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*), particularly when joeys are first emerging from the pouch. Baiting and fire management programs in the adjoining Kalbarri National Park are likely to be important for the ongoing survival of this species in the area and operations on the solar farm should not impede the ability of DPaW to actively manage habitat for this species. No other threatened fauna were found to occur in the solar farm area and the habitat was unsuitable for the remaining species identified in Table 6.

Within the Proposed Wittecarra Crek Conservation Reserve, potential habitat was found for six listed species, however there was no evidence that any threatened species were currently using habitat in this area.

- An old record of Chuditch (*Dasyurus geofroii*) near the southern boundary of the proposed reserve area suggests that the *Casuarina* habitat fringing the saltmarsh was once suitable for this species. The habitat is not currently suitable due to an almost complete lack of understorey vegetation due to the closed nature of the woodland and a complete lack of den logs. There are however a number of mature *Eucalyptus camaldulensis* within the *Casuarina* woodland that contain hollows which could be suitable for chuditch in the future once these trees die and fall over. A more open canopy would also increase the understorey vegetation within this vegetation unit.
- Roosting and Breeding habitat was present within the *Casuarina* woodlands for Carnaby's Cockatoo (*Calyptorhynchus latirostris*). Suitable trees included nine *E. camaldulensis* and one *Casuarina obesa* that had diameters at breast height of between 70 and 100 cm. Four of the *E. camaldulensis* contained evidence of hollows. Foraging habitat was also present in the proteaceous heath ecotype. There was however, no evidence that the habitat trees or the foraging habitat were currently being used by this species.
- The habitat trees mentioned above were also potentially suitable for use by Osprey (*Pandion haliaetus*) and White-bellied Sea-Eagles (*Haliaeetus leucogaster*), given the proximity of this site to the ocean. Once again, there was no evidence that these species were using the area, despite the survey being completed during breeding season.
- The saltmarsh provides potential habitat for the Curlew Sandpiper (Calidris ferruginea) and the Grey Plover (Pluvialis squatarola). At the time of this survey, the lake contained minimal water, and it was not possible to adequately survey for these species, as they are unlikely to have been using the system under these conditions.

In addition to threatened fauna species, the field survey identified 39 common fauna species occurring within the survey area (Table 7). Of these species 26 were birds, six species were invertebrates, three species were mammals and two were reptiles. Reptile diversity is expected to be higher than observed in this area due to the sandy habitat and open heath land ecotypes. The season of this survey was not conducive to effective reptile surveys.

Table 6: Threatened Fauna Survey Outcomes for Lot 10792 George Grey Rd, Kalbarri (Solar Farm and Wittecarra Creek survey areas combined)

Class	Species	Cons Status	Habitat	Potentially Suitable Habitat	Evidence of Species Onsite	Comments
Bird	*Actitis hypoleucos*, Common Sandpiper	IA	Dawn survey within potential habitat; a wide range of coastal wetlands around muddy margins or rocky shores (Geering et al. 2007; Higgins & Davies 1996).	N	N	No suitable habitat or evidence of the species
Bird	*Calidris alba*, Sanderling	IA	Dawn survey within potential habitat; open sandy beaches exposed to open sea-swell and exposed sandbars and spits (Higgins & Davies 1996).	N	N	No suitable habitat or evidence of the species
Bird	*Calidris ferruginea*, Curlew Sandpiper	VU	Dawn survey within potential habitat; intertidal mudflats in sheltered coastal areas, non-tidal swamps, lakes and lagoons near the coast, and occasionally ephemeral and permanent lakes and dams with mud or sand edges (Higgins & Davies 1996).	Y	N	Saltmarsh contained minimal water at the time of survey but could support this species when inundated.
Bird	*Calidris ruficollis*, Red-necked Stint	IA	Dawn survey within potential habitat; mostly coastal areas, including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats; ephemeral or permanent shallow wetlands near the coast or inland, and sometimes flooded paddocks or damp grasslands (Higgins & Davies 1996).	N	N	No suitable habitat or evidence of the species
Bird	*Calyptorhynchus latirostris*, Carnaby's Cockatoo	EN	Dawn sightings and calls to identify potential breeding and roosting trees. Identification of suitable breeding trees within the survey area (DBH> 50cm); Survey for foraging habitat (proteaceous heath/woodland, eucalypt woodlands or forest) and search for evidence of foraging and roosting e.g. chewed nuts, droppings and feathers.	Y	N	Roosting and Breeding habitat was present within the *Casuarina/ E.camaldulensis* woodlands and foraging habitat was present in proteaceous heath within the proposed Wittecarra Creek Conservation Reserve. No evidence that the habitat is currently used by this species.
Bird	*Charadrius leschenaultia*, Greater Sand Plover	IA	Dawn survey within potential habitat; sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons (Stewart et al. 2007).	N	N	No suitable habitat or evidence of the species

Table 6 continued

Class	Species	Cons Status	Habitat	Potentially Suitable Habitat	Evidence of Species Onsite	Comments
Bird	*Charadrius mongolus*, Lesser Sand Plover	EN	Dawn survey within potential habitat; large intertidal sandflats or mudflats in sheltered bays and occasionally sandy ocean beaches, coral reefs and rocky outcrops.	N	N	No suitable habitat or evidence of the species
Bird	*Haliaeetus leucogaster*, White-bellied Sea-Eagle	IA	Diurnal sightings and calls to identify potential breeding and roosting trees. Survey of potential habitat for nests; coastal habitats near the ocean and around terrestrial wetlands. Require large areas of open water (Marchant & Higgins 1993) and large trees for nesting.	Y	N	Potential habitat trees present in the *Casuarina/ E.camaldulensis* woodlands within the Wittecarra Creek Conservation Reserve.
Bird	*Leipoa ocellata*, Malleefowl	VU	Track surveys in sandy soils and searches for nesting mounds. Preferred habitat includes shrublands and low woodlands that are dominated by mallee vegetation, eucalypt or *Callitris* woodlands, *Acacia* shrublands or coastal heathlands (Marchant and Higgins 1993).	Y	N	Feral animal activity probably makes this area unsuitable for this species. No evidence (past or present) was found for this species onsite.
Bird	*Merops ornatus*, Rainbow Bee-eater	IA	Dawn survey for calling birds, nest search (long burrow) in flat or sloping ground, in the banks of rivers, creeks or dams (Higgins 1999).	N	N	No suitable habitat or evidence of the species
Bird	*Pandion haliaetus*, Osprey	IA	Diurnal sightings and calls to identify potential breeding and roosting trees. Survey of potential habitat for nests; coastal habitats around shallow waters (del Hoyo et al. 1992)	Y	N	Potential habitat trees present in the *Casuarina/ E.camaldulensis* woodlands within the Wittecarra Creek Conservation Reserve.
Bird	*Pluvialis squatarola*, Grey Plover	IA	Dawn survey within potential habitat; sheltered embayments, estuaries and lagoons with mudflats and sandflats; terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes (Marchant and Higgins 1993).	Y	N	Saltmarsh contained minimal water at the time of survey but could support this species when inundated.
Bird	*Tringa nebularia*, Common Greenshank	IA	Dawn survey within potential habitat; sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	N	N	No suitable habitat or evidence of the species
Invert	*Idiosoma nigrum*, Shield-backed Trapdoor Spider	VU	Burrow search in suitable habitat. Clay soils of eucalypt woodlands and *Acacia* vegetation,with leaf-litter and twigs present (Main, 1996; 2003)	N	N	No suitable habitat or evidence of the species

Table 6 continued

Class	Species	Cons Status	Habitat	Potentially Suitable Habitat	Evidence of Species Onsite	Comments
Invert	*Synemon gratiosa* Graceful Sunmoth	P4	Search for potential habitat. Coastal dunes and Banksia woodlands (DEC 2011). Larvae feed on Lomandra maritima in coastal dune, or Lomandra hermaphrodita in Banksia woodland (Bishop et al. 2010, DEC 2011).	N	N	No Banksia woodlands or Lomandras present within survey area.
Mammal	*Dasyurus geoffroii*, Chuditch, Western Quoll	VU	Nocturnal survey and searches for faecal material and potential den sites in wooded habitat. Logs must have a diameter > 30 cm and a hollow with 7–20 cm diameter and 1 m length (Dunlop and Morris 2012)	Y	N	No den logs are currently present, however the *Casuarina/ E.camaldulensis* woodlands contain mature standing trees with hollows that have the potential to provide habitat in the future, as the trees fall.
Mammal	*Macropus eugenii subsp. derbianus* Tammar Wallaby (WA subsp)	P5	Nocturnal surveys and search for faecal material onsite. Preferred habitat includes coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland.	Y	Y	Old faecal material from a Tammar Wallaby was found in closed *Acacia* shrub land on the eastern boundary of the solar farm area.
Reptile	*Lerista axillaris*, Stripe-sided Robust Slider	P2	Observation of basking skinks and litter searches beneath *Acacia* rostellifera scrub on brown sandy loam. Known from only one locality 21 km S of Kalbarri.	N	N	No suitable habitat or evidence of the species. Soils onsite were predominantly deep yellow sands.
Reptile	*Lerista humphriesi*, Taper-tailed West-coast Slider	P3	Habitat undescribed for this species; in the absence of information survey technique was as for *L. axillaris.*	N	N	No evidence of the species
Reptile	*Pletholax gracilis subsp. edelensis*, Keeled Legless Lizard	P3	Search for suitable habitat; dense Triodia on pale brown loams; under Spinifex longifolius on white coastal dunes (Storr and Harold 1978), under low open Triodia plurinervata or low *Acacia* on light pink-brown sandy loam; and under very sparse *Acacia* over dense low heath on grey loamy sand.	N	N	No suitable habitat or evidence of the species

Table 7: Common fauna species identified during field survey of Lot 10792 George Grey Rd, Kalbarri (Solar Farm and Wittecarra Creek areas combined)

Family	Species	Common Name
Acanthizidae	*Acanthiza apicalis*	Inland Thornbill
Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill
Acanthizidae	*Gerygone fusca*	Western Gerygone
Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren
Acanthizidae	*Smicrornis brevirostris*	Weebill
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike
Casuariidae	*Dromaius novaehollandiae*	Emu
Corvidae	*Corvus coronoides*	Australian Raven
Cuculida	*Cacomantis flabelliformis*	Fan-tailed Cuckoo
Cuculida	*Cacomantis pallidus*	Pallid Cuckoo
Cuculida	*Chrysococcyx basalis*	Bronze Cuckoo
Dicruridae	*Grallina cyanoleuca*	Magpie-lark
Dicruridae	*Rhipidura fuliginosa subsp. preissi*	Grey Fantail
Dicruridae	*Rhipidura leucophrys*	Willie Wagtail
Estrilidae	*Taeniopygia guttata*	Zebra Finch
Lycosidae	*Lycosa godeffroyi*	
Lycosidae	*Tasmanicosa leuckartii*	
Lycosidae	*Venator immansueta*	
Macropodidae	*Macropus eugenii subsp. derbianus*	Tammar Wallaby
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
Maluridae	*Malurus pulcherrimus*	Blue-breasted Fairy-wren
Maluridae	*Malurus splendens*	Splendid Fairy-wren
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird
Meliphagidae	*Certhionyx niger*	Black Honeyeater
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater
Molossidae	*Tadarida australis*	White-striped Freetail-bat
Nephilidae	*Nephila edulis*	
Nicodamidae	*Nicodamus mainae*	
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush
Pachycephalidae	*Pachycephala pectoralis*	Golden Whistler
Pardalotidae	*Pardalotus striatus*	Striated Pardalote
Petroicidae	*Petroica cucullata*	Hooded Robin
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler
Scincidae	*Menetia greyii*	
Scincidae	*Morethia lineoocellata*	
Zodariidae	*Storena formosa*	
Zosteropidae	*Zosterops lateralis*	Silvereye

3.3 Introduced taxa

The goat (*Capra hircus*), feral pig (*Sus scrofa*), introduced fox (*Vulpes vulpes*), European rabbit (*Oryctolagus cuniculus*), feral cat (*Felis catus*), introduced rat (*Rattus rattus*) and introduced mouse (*Mus mus*) are likely to occur within the survey area (DoE 2015).

Evidence of fox activity was found in the solar farm area within the low open *Acacia* heath land and *Acacia* shrub land. Fox population densities appeared to be low-moderate, with one scat and three sets of tracks found within the 25 ha survey area. The probability of detecting introduced taxa was high due to the sandy nature of the soils and access tracks. The fox is an opportunistic predator and scavenger and has been recognised as a serious threat to Australian native fauna.

Goat scats were found in the solar farm and Wittecarra Creek areas under dense *Acacia* adjacent to more open areas of heath land. The density of goats in this area appeared to be relatively low with three sets of scats located in the Solar Farm area and 2 sets in the Wittecarra Creek area. Goats in this area are likely to compete with native herbivores for food and shelter and cause land and wetland degradation.

Faecal material from rabbits was also observed during the survey and evidence of this species was observed throughout the solar farm and Wittecarra Creek areas within the *Acacia* shrub lands and open heath lands. European rabbits are nocturnal grazers, foraging on green grass and herbs. They compete with native herbivores and can have a significant impact on plant regeneration by eating seeds and seedlings. Introduced rodents also compete with native fauna for food and nesting habitat and can have a significant impact on plant regeneration.

3.4 Potential impacts on fauna

The proposed solar farm area will require the complete clearing of vegetation on-site, in order to facilitate construction and to protect infrastructure. The Tammar Wallaby was the only listed species located within the survey area and animals appeared to be transient visitors to the site, as evidenced from the low levels of scattered activity observed. Clearing activities within the solar farm area are unlikely to contribute to significant loss of habitat or habitat fragmentation for this species, given the connectivity of the area to the surrounding Kalbarri National Park and uncleared areas of Lot 10792. Tammar Wallabies using the site at the time of clearing could be readily encouraged to move into the adjoining National Park and uncleared areas of Lot 10792 during clearing operations, using techniques such clearing from a single point and in a single direction, and field survey and physical shepherding of animals ahead of the machine(s). The likelihood of individuals being injured during clearing operations could also be reduced using these techniques.

Another potential impact arising from this proposed development is associated with the solar farm infrastructure itself. Sunlight reflecting from the solar panels and collection units has the potential to temporarily blind fauna (and humans) accessing the area. The solar farm area is adjacent to the Kalbarri National Park on its southern and eastern boundary. In an effort to protect National Park users and fauna, vegetated buffers will be established around the solar farm to provide a visual separation. These buffers are 200 m deep on the southern boundary and 310 m deep on the eastern boundary (adjusted boundary). Fencing around the outside of the solar farm and buffers will provide a barrier to the movement of ground dwelling fauna. Studies on the impact of solar farms on fauna in Australia and other parts of the world suggest that there are no adverse effects on ground-dwelling fauna where buffers and fencing have been applied (Street *et al*. 2011; Kagan et al. 2014; RSPB 2014).

The risk to flying animals from solar farms is obviously higher and there is some evidence to suggest that concentrated solar power installations can cause bird fatalities through collisions and burns; as birds fly through the concentrated rays of sunlight or are affected by reflected light (Kagan et al. 2014; RSPB 2014). Much of the problem appears to lie in the 'lake effect', in which birds and their insect prey can mistake a reflective solar facility for a water body and then fly towards it. Given the apparent lack of data relating to the impact of solar farms on birds in Australia, and the presence of habitat for a large range of threatened bird species in the surrounding Kalbarri National Park and coastal areas, it is recommended that this situation be monitored and thought given to techniques that could reduce potential impacts.

4 THREATENED ECOLOGICAL COMMUNITIES

Subtropical and Temperate Coastal Saltmarsh Ecological Community

Coastal Saltmarsh is a mostly treeless plant community recognised by a low mosaic of succulent herbs, salt tolerant grasses and sedges. The community is occurs in coastal areas under tidal influence, such as the tidal flats of estuaries, salt lakes and on edges of intermittently opened coastal lagoons. These communities are characterised by vegetation interspersed with unvegetated patches or salt pans (Saintilan 2009; Saintilan and Rogers 2013; English 2014).

Coastal saltmarsh vegetation is recognised nationally and globally as an ecosystem of high ecological value that is increasingly under threat. The Australian Government has just listed the Subtropical and Temperate Coastal Saltmarsh as a nationally Threatened Ecological Community (TEC), with a ranking of vulnerable. The vegetation type is also listed as a Priority Ecological Community PEC) in Western Australia (English 2014). . The flora that occurs in WA's coastal saltmarsh is richer than has been recorded in other states of Australia and mainly includes salt-tolerant vegetation (*halophytes*) such as grasses, herbs, reeds, sedges, and shrubs. The two most common plant families are salt bushes (*Chenopodiaceae*) and the grasses (*Poaceae*) (Saintilan 2009; English 2014).

In WA, the coastal saltmarsh occurs in a narrow coastal margin in subtropical and temperate zones - south of the Tropic of Capricorn (23° south latitude). The coastal saltmarsh vegetation helps to maintain the coastal habitat in healthy condition by filtering water as it flows towards the ocean, providing a fish nursery habitat and food and nutrients for fauna, and helping to buffer coastlines from damaging winds and wave action (English 2014).

Coastal saltmarsh occurs in the proposed Wittecarra Creek Conservation Reserve, which contains a salt lake that is under tidal influence. Flora that contributes to the community includes a range of salt tolerant species such as: *Tetricornia halocnemoides, Tetricornia indica ssp. biden, Atriplex amnicola, Enchylaena tomentosa, Rhagodia latifolia subsp latifolia* and *Rhagodia preissii subsp. obovata.* This community is represented as coastal saltmarsh in Figure 3 and Table 4.

Although the saltmarsh areas may appear to be rather barren and harsh environments, they can be damaged by pressures including changes to drainage and water quality, weed invasion and erosion. The current unmanaged access to the Wittecarra Creek area is contributing to degrading processes affecting this community.

5 SUMMARY POINTS AND RECOMMENDATIONS

5.1 Solar Farm

Threatened Flora and Vegetation

- There were no species of threatened flora located within the solar farm area.
- A small area of standstone was mapped in the north eastern corner of the proposed clearing. While there were no populations of threatened flora associated with the outcrop, the sensitivity of this ecological community to disturbance is considered to be higher than that of the surrounding *Acacia* communities and the proponent has agreed to shift the proposed solar farm area to the west to avoid this ecotype. The adjusted boundary is shown in Figure 2 and was negotiated with the proponent onsite, so was able to be surveyed as part of this assessment.

Threatened Fauna

- The Tammar Wallaby was the only listed species found within the solar farm area and appeared to be a transient visitor to the site, as evidenced from low levels of scattered activity. Clearing within the solar farm area is unlikely to contribute to significant loss of habitat or habitat fragmentation for this species, given the connectivity of the area to the surrounding Kalbarri National Park and uncleared areas of Lot 10792.
- Tammar Wallabies using the site at the time of clearing should be encouraged to move into the adjoining National Park and uncleared areas of Lot 10792, using techniques such clearing from a single point and in a single direction, and field survey and physical shepherding of animals.
- Tammar Wallabies are at risk from predation by feral animals such as the Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*), particularly when joeys are first emerging from the pouch. Baiting and fire management programs in the adjoining Kalbarri National Park are likely to be important for the ongoing survival of this species in the area and operations on the solar farm should not impede the ability of DPaW to actively manage habitat for this species.
- Sunlight reflecting from the solar panels and collection units has the potential to temporarily blind fauna (and humans) accessing the area. The solar farm area is adjacent to the Kalbarri National Park on its southern and eastern boundary. In an effort to protect National Park users and fauna, vegetated buffers will be established around the solar farm to provide a visual separation. These buffers are 200 m deep on the southern boundary and 310 m deep on the eastern boundary (adjusted boundary). Fencing around the outside of the solar farm and buffers will provide a barrier to the movement of ground dwelling fauna.
- There is some evidence to suggest that concentrated solar power installations can cause bird fatalities through collisions and burns; as birds fly through the concentrated rays of sunlight or are affected by reflected light (Kagan et al. 2014; RSPB 2014). Much of the problem appears to occur from the “lake effect,” in which birds and their insect prey can mistake a reflective solar facility for a water body and then fly towards it. Given the apparent lack of data relating to the impact of solar farms on birds in Australia, and the presence of habitat for a large range of threatened bird species in the surrounding Kalbarri National Park and coastal areas, it is recommended that this situation be monitored and thought given to techniques that could reduce potential impacts. E.g. measures to reduce or shield harmful reflection.
- The Solar Farm will be fenced to exclude wildlife, the detail on the barrier fenceing will be supplied to Parks and Wildlife prior to the construction perioed. A recent meeting with Parks and Wildlife staff (17/10/2015) indicated a recent style of fence used in the region may have been successful to and the same should be used at the Solar Farm to exclude Tamar Wallabies from entering the site.

Weed management

- There were few weeds within the solar farm area. Weed management requirements are related to long term management of the site to ensure minimal impact on the nearby Kalbarri National Park. Ongoing maintenance activities should include management of weeds arising from clearing and solar farm activities, such that these do not spread offsite into the surrounding National Park.

5.2 Road Alignment

- No threatened flora, threatened fauna or diverse ecotype zones were located along the proposed road alignment west of the solar farm.

5.3 Proposed Wittecarra Creek Conservation Reserve

The proposed Wittecarra Creek Conservation Reserve contains a number of conservation values worthy of reservation:

- The area contains a vulnerable listed Threatened Ecological Community, known as the *Subtropical and Temperate Coastal Saltmarsh Ecological Community.* The community is associated with the salt pans and includes a range of salt tolerant species such as: *Tetricornia halocnemoides, Tetricornia indica ssp. biden, Atriplex amnicola, Enchylaena tomentosa, Rhagodia latifolia subsp latifolia* and *Rhagodia preissii subsp. obovata.*
- The area contains a population of *Chamelaucium marchantii* (P3) that dominates a small area of shrubland east of the saltmarsh.
- The coastal saltmarsh vegetation helps to maintain the nearby coastal habitat in healthy condition by filtering water as it flows towards the ocean, providing a fish nursery habitat and food, providing nutrients for fauna, and helping to buffer the coastline from damaging winds (English 2014).
- Roosting and Breeding habitat for Carnaby's Cockatoo is present within the *Casuarina* woodlands, in the form of nine large *E. camaldulensis* and one *C. obesa,* four of which contain existing hollows. Foraging habitat is also present for this species in the proteaceous heath ecotype, which is in pristine condition.
- The habitat trees mentioned above are also potentially suitable for use by Osprey (*Pandion haliaetus*) and White-bellied Sea-Eagles (*Haliaeetus leucogaster*), given the proximity of this site to the ocean, and the relative scarcity of large trees in this landscape.
- The saltmarsh provides potential habitat for the Curlew Sandpiper (Calidris ferruginea) and the Grey Plover (Pluvialis squatarola).
- The area is likely to provide a significant long-term ecological linkage between the coastal ecotypes to the west and the Kalbarri National Park to the east, via the Wittecarra Creek. The area is also likely to provide effective fire refuge due to edaphic barriers to fire associated with the saltmarsh.

Management considerations for the area include:

- There is a medium degree of disturbance from weeds, illegal firewood cutting, rubbish dumping and vehicle access in the western sections of the reserve area. This is affecting the saltmarsh area and *Casuarina* woodland ecotypes.
- Despite unmanaged access to the area, the presence of weeds is largely limited to vehicle tracks, saltmarsh and *Casuarina* woodland areas adjacent to farm land. None of the weeds present are declared or rated as a high priority for control in the State Environmental Weed Strategy. The weeds occur in manageable and readily accessible areas and would be eradicatable within the survey area, if the source can be managed.

- Evidence of fox, goat and rabbit activity was found onsite, however activity levels are quite low and dense ecotypes such as the proteaceous heath and Acacia shrub land are likely to provide good predator refuge for native species.

5.4 EPBC Act Considerations

There are no EPBC Act considerations or issues requiring referral as a result of the proposed clearing and development activities associated with the solar farm on Lot 10792.

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7 APPENDICES

APPENDIX A: **DPaW Threatened and Priority Flora database search generated August 2015.**

Taxon	Status	Rank	IUCN	EPBC	Distribution
Acacia gelasina	2				Kalbarri NP, Eurardy
Acacia leptospermoides subsp. obovata	2				Kalbarri NP, Murchison River
Acacia plautella	3				Ajana, Wannoo Roadhouse, Murchison, Eurardy Station, Kalbarri NP, Cooloomia NR
Acacia stereophylla var. cylindrata	2				Kalbarri NP
Acanthocarpus parviflorus	3				Kalbarri N.P., Shark Bay
Anthocercis intricata	3				Dongara, Port Gregory, Denham, Kalbarri
Anthotroche myoporoides	3				Northampton, Yuna, Indarra, Kalbarri NP
Arnocrinum drummondii	3				Gunyidi, Watheroo, Kalbarri, Cooloomia, Mullewa
Astroloma inopinatum	1				Kalbarri
Austroparmelina macrospora	3				Kalgoorlie, Ninghan Stn, Wanjarri NR,Mount Harry, Kathleen, Bullfinch, Kalbarri
Baeckea subcuneata	2				Kalbarri N.P.
Beyeria cinerea subsp. cinerea	3				Murchison River, Kalbarri, Warroora Stn, Coolimba, Tamala Stn, Shark Bay
Beyeria gardneri	3				Murchison River, Eurardy Station, Badgingarra, Kalbarri NP, Indara NR, Marchagee NR, Watheroo NP, Coorow, Three Springs
Bossiaea calcicola	3				Shark Bay, Kalbarri, Hutt Lagoon, East Wallabi Is.
Bossiaea inundata	2				Kalbarri NP
Caladenia barbarella	T	EN	D	EN	NE of Kalbarri
Caladenia bryceana subsp. cracens	T	EN	B1ab(iii,iv,v)+B2ab(iii,iv,v)	VU	Northampton-Kalbarri, East Yuna NR
Caladenia hoffmanii	T	EN	B1b(iii)+2ab(iii)	EN	Geraldton-Kalbarri
Caladenia longicauda subsp. minima	2				East Yuna N.R., Kalbarri
Caladenia wanosa	T	EN	B1ab(iii)+B2ab(iii)	VU	Kalbarri-Mullewa
Calectasia browneana	2				Warradarge, Kalbarri
Calothamnus cupularis	2				Kalbarri N.P.
Calytrix formosa	3				Galena, Kalbarri N.P.
Calytrix harvestiana	2				Murchison House Station, Kalbarri,Yuna,
Calytrix paucicostata	2				Kalbarri
Calytrix pimeleoides	3				Kalbarri, Northampton, Ajana, Ogilvie

Appendix A continued

Taxon	Status	Rank	IUCN	EPBC	Distribution
Calytrix purpurea	2				Red Bluff, Kalbarri
Carpobrotus sp. Thevenard Island (M. White 050)	3				Thevenard Island, Francois Peron N.P., Cape Range N.P., Kalbarri N.P.
Centrolepis cephaloformis subsp. murrayi	3				Kalbarri, Recherche Arch.
Chamelaucium marchantii	3				Kalbarri
Cryptandra glabriflora	2				Kalbarri N.P.
Dampiera sp. Jurien (G. Lullfitz s.n. 10/7/1986)	2				Jurien, Kalbarri
Desmocladus biformis	3				Kalbarri, Badgingarra
Dicrastylis micrantha	3				Useless Loop, Kalbarri, Nerren Nerren Station, Shark Bay
Diuris recurva	4				Kalbarri-Moora, W of Northampton
Drakaea concolor	T	EN	B1+2ce; C2a	VU	Murchison River, Kalbarri
Enekbatus cristatus	2				Kalbarri NP
Eremophila microtheca	4				W of Eneabba, NE of Kalbarri
Eremophila occidens	2				Cape Range, Kalbarri
Eucalyptus arachnaea subsp. arrecta	3				Mingenew - Morawa, Mullewa, East Yuna, Kalbarri
Eucalyptus beardiana	T	EN	D	VU	South of Shark Bay, Kalbarri NP
Frankenia confusa	4				Kalbarri, Galena, Ajana, Port Gregory, Corrigin
Geleznowia sp. Red Bluff (A. Crawford ADC 597)	2				Kalbarri
Grevillea costata	3				Kalbarri, Galena
Grevillea leucoclada	3				Kalbarri
Grevillea rogersoniana	3				Shark Bay, Hamelin Pool, Denham, Nanga, Kalbarri
Grevillea stenomera	2				Kalbarri, Tamala
Guichenotia impudica	3				Konnongorring, Wongan Hills, Corrigin, Kellerberrin, Tammin, Mogumber, Walgoolan, Kalbarri, Northampton
Hemiandra sp. Kalbarri (D. Bellairs 1505)	2				Kalbarri NP
Hypocalymma angustifolium subsp. Hutt River (S. Patrick 2982)	T	VU	D2		Arrino, Kalbarri
Jacksonia velutina	4				Kalbarri, Ajana, Binnu, East Yuna, Eradu, Watheroo, E of Hamelin Pool
Keraudrenia saxatilis	2				Kalbarri NP
Lasiopetalum oldfieldii subsp. oldfieldii	3				Kalbarri, Port Gregory, Yerina Springs
Lasiopetalum oppositifolium	3				Murchison River, Kalbarri, Red Bluff, Tamala Stn.
Lechenaultia chlorantha	T	EN	D	VU	Kalbarri
Lepidobolus densus	3				Coorow, Dirk Hartog Is., Shark Bay, Kalbarri NP, Three Springs, Morawa, Marchagee, Alexander Morrison N.P., North Wallambin,Billeranga Hills
Lepidosperma rupestre	4				Kalbarri N.P.

Appendix A continued

Taxon	Status	Rank	IUCN	EPBC	Distribution
Liparophyllum congestiflorum	4				Kalbarri, Hutt River, Eneabba
Macarthuria intricata	3				Shark Bay, Kalbarri
Taxon	Status	Rank	IUCN	EPBC	Distribution
Malleostemon sp. Hardabutt Rapids (D. Bellairs 1654A)	1				Nerren Nerren, Kalbarri
Malleostemon sp. Kalbarri (L.A. Craven 7083)	2				Kalbarri N.P.
Malleostemon sp. Moonyoonooka (R.J. Cranfield 2947)	2				Kalbarri, Geraldton
Malleostemon sp. Yerina (S.J. Patrick 2728)	1				Yerina Spring, Kalbarri, Binnu
Melaleuca boeophylla	2				Kalbarri, Overlander Roadhouse
Melaleuca oldfieldii	2				Kalbarri
Microcorys tenuifolia	3				Morawa, Kalbarri NP, Yuna, Wongan Hills, Marchagee
Millotia jacksonii	2				Kalbarri NP
Mirbelia corallina	3				Murchison River, Kalbarri
Murchisonia fragrans	2				Kalbarri, Mileura, Moorarie
Paracaleana alcockii	2				Galena, Kalbarri N.P.
Persoonia brachystylis	2				Kalbarri
Philotheca kalbarriensis	2				Kalbarri, Toolonga, Coolcalalaya Stn
Physopsis chrysophylla	3				Eurardy Stn, Shark Bay, Kalbarri
Pileanthus aurantiacus	1				Kalbarri
Pileanthus bellus	3				Kalbarri
Pityrodia viscida	4				Yandanooka, Mingenew, Kalbarri NP, Three Springs, Tathra N.P.
Platysace sp. Kalbarri (D. & B. Bellairs 1383)	2				Kalbarri
Scaevola kallophylla	4				Kalbarri, Greenough River
Scaevola oldfieldii	3				Kalbarri, Murchison River, Oakabella
Scaevola sp. Golden hairs (D. & B. Bellairs 1450 A)	1				Kalbarri
Schoenus sp. Kalbarri (K.R. Newbey 9352)	2				Kalbarri, Mt Augustus
Scholtzia sp. Ajana (T.A. Halliday 137)	3				Kalbarri N.P.
Scholtzia sp. Eradu (R.D. Royce 8016)	2				Eradu, Yuna, Coorow, Murchison River, Kalbarri
Scholtzia sp. Eurardy (J.S. Beard 6886)	2				Eurardy, Murchison House Station, Kalbarri, Meadow Station, Port Gregory
Scholtzia sp. Folly Hill (M.E. Trudgen 12097)	2				Hamelin, Ajana, Cooloomia, Kalbarri
Scholtzia sp. Ross Graham Lookout (S. Maley 6)	2				Kalbarri N.P.
Scholtzia sp. Z-Bend (Bellairs-Kalflora 912a)	2				Kalbarri N.P.
Stachystemon nematophorus	4			VU	Murchison River, Kalbarri
Stenanthemum divaricatum	3				Dirk Hartog Island, Quobba Stn, Dorre Is., Kalbarri, Shark Bay
Thryptomene calcicola	2				Kalbarri N.P.

Appendix A continued

Taxon	Status	Rank	IUCN	EPBC	Distribution
Thryptomene johnsonii	2				Kalbarri
Thryptomene sp. Eagle Gorge (A.G. Gunness 2360)	2				Kalbarri, Zuytdorp
Taxon	Status	Rank	IUCN	EPBC	Distribution
Thryptomene sp. Wandana (M.E. Trudgen MET 22016)	3				Eurardy, Yuna, Mt Singleton,Wandana NR, Kalbarri, Perenjori, McGaurans NR
Thryptomene stenophylla	2				Kalbarri, Geraldton
Thryptomene striata	2				Kalbarri
Thysanotus sp. Kalbarri (D. & B. Bellairs 1523 A)	2				Kalbarri NP
Triodia bromoides	4				Shark Bay, (Murchison River), Kalbarri
Triodia dielsii	3				Kalbarri
Verticordia capillaris	4				Ajana, Mullewa, Ardingly, Mingenew, Kalbarri, Yuna
Verticordia dasystylis subsp. kalbarriensis	2				Kalbarri
Verticordia densiflora var. roseostella	3				Eneabba to Burma Road, Yuna, Kalbarri
Verticordia dichroma var. dichroma	3				N of Kalbarri N.P. to N of Vermin Proof Fence
Verticordia dichroma var. syntoma	3				N of Kalbarri N.P. to N of Vermin Proof Fence
Verticordia galeata	2				Kalbarri N.P.
Verticordia polytricha	4				Kalbarri N.P. to Eurardy Station
Verticordia x eurardyensis	1				Eurardy Station, Kalbarri NP
Xanthoparmelia norpraegnans	2				Kalbarri, Bulla Bulling

APPENDIX B: Flora and Fauna Species Identified within 5 km of Survey area Through Nature Map

Generated from Nature Map (DPaW 2015) on 25 July 2015

Acanthizidae

1. 24260 *Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*
2. 24261 *Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*
3. 24265 *Acanthiza uropygialis (Chestnut-rumped Thornbill)*
4. 24269 *Calamanthus campestris (Rufous Fieldwren)*
5. 25530 *Gerygone fusca (Western Gerygone)*
6. 24278 *Pyrrholaemus brunneus (Redthroat)*
7. 25534 *Sericornis frontalis (White-browed Scrubwren)*
8. 24279 *Sericornis frontalis subsp. maculatus (White-browed Scrubwren)*
9. 30948 *Smicrornis brevirostris (Weebill)*

Accipitridae

10. 25535 *Accipiter cirrocephalus (Collared Sparrowhawk)*
11. 24281 *Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*
12. 25536 *Accipiter fasciatus (Brown Goshawk)*
13. 24285 *Aquila audax (Wedge-tailed Eagle)*
14. 24286 *Aquila morphnoides subsp. morphnoides (Little Eagle)*
15. 24288 *Circus approximans (Swamp Harrier)*
16. 24293 *Haliaeetus leucogaster (White-bellied Sea-Eagle)* IA
17. 24295 *Haliastur sphenurus (Whistling Kite)*

Acrotylaceae

18. 26665 *Claviclonium ovatum*

Agamidae

19. 30833 *Amphibolurus longirostris (Long-nosed Dragon)*
20. 30899 *Ctenophorus adelaidensis (Southern Heath Dragon, Western Heath Dragon)*
21. 42384 *Ctenophorus butlerorum (Shark Bay Heath Dragon)*
22. 25460 *Ctenophorus maculatus (Spotted Military Dragon)*
23. 24881 *Ctenophorus maculatus subsp. maculatus (Spotted Military Dragon)*
24. 24882 *Ctenophorus nuchalis (Central Netted Dragon)*
25. 24886 *Ctenophorus reticulatus (Western Netted Dragon)*
26. 24904 *Moloch horridus (Thorny Devil)*
27. 24907 *Pogona minor subsp. minor (Dwarf Bearded Dragon)*

Agaricaceae

28. 38765 *Battarrea stevenii*

Aizoaceae

29. 18359 *Carpobrotus sp. Thevenard Island (M. White 050)* P3
30. 2798 *Carpobrotus virescens (Coastal Pigface, Kolboko)*
31. 2799 *Disphyma crassifolium (Round-leaved Pigface)*
32. 2810 *Gunniopsis septifraga*
33. 2823 *Tetragonia implexicoma (Bower Spinach)*

Amaranthaceae
34. 2717 *Ptilotus divaricatus (Climbing Mulla Mulla)*
35. 2719 *Ptilotus eriotrichus*
36. 41505 *Ptilotus gaudichaudii subsp. eremita*
37. 2729 *Ptilotus grandiflorus*
38. 2733 *Ptilotus humilis*
39. 2742 *Ptilotus manglesii (Pom Poms, Mulamula)*
40. 41001 *Ptilotus nobilis subsp. nobilis (Yellow Tails)*
41. 2747 *Ptilotus obovatus (Cotton Bush)*
42. 2751 *Ptilotus polystachyus (Prince of Wales Feather)*
43. 2763 *Ptilotus stirlingii (Stirling's Mulla Mulla)*
44. 40841 *Ptilotus stirlingii subsp. stirlingii*
45. 2766 *Ptilotus villosiflorus*
Ameiridae
46. *Nitocra near sp. 4 (SAP)*
47. *Nitocra nr sp. 4*
Anacardiaceae
48. 11027 *Schinus terebinthifolius* Y
Anadyomenaceae
49. 27074 *Microdictyon umbilicatum*
Anarthriaceae
50. 18049 *Lyginia imberbis*
Anatidae
51. 24312 *Anas gracilis (Grey Teal)*
52. 24315 *Anas rhynchotis (Australasian Shoveler)*
53. 24316 *Anas superciliosa (Pacific Black Duck)*
54. 24318 *Aythya australis (Hardhead)*
55. 24319 *Biziura lobata (Musk Duck)*
56. 24322 *Cygnus atratus (Black Swan)*
57. 24331 *Tadorna tadornoides (Australian Shelduck, Mountain Duck)*
Ancylidae
58. *Ferrissia petterdi*
Antennariidae
59. *Allenichthys glauerti*
60. *Histrio histrio*
Aphanopetalaceae
61. 3180 *Aphanopetalum clematideum*
Apiaceae
62. 6210 *Apium annuum*
63. 6211 *Apium prostratum (Sea Celery)*
64. 6218 *Daucus glochidiatus (Australian Carrot)*
65. 16339 *Platysace sp. Kalbarri (D. & B. Bellairs 1383)* P2
Apocynaceae
66. 6565 *Alyxia buxifolia (Dysentery Bush)*
67. 6569 *Catharanthus roseus (Pink Periwinkle)* Y
68. 13006 *Sarcostemma viminale subsp. australe*

Araliaceae
69. 19253 *Trachymene ceratocarpa*
70. 6266 *Trachymene coerulea (Blue Lace Flower)*
71. 19042 *Trachymene coerulea subsp. leucopetala*
72. 6268 *Trachymene cyanopetala*
73. 6272 *Trachymene elachocarpa*
74. 6279 *Trachymene ornata (Spongefruit)*
75. 6280 *Trachymene pilosa (Native Parsnip)*
Araneidae
76. *Argiope protensa*
77. *Argiope trifasciata*
78. *Austracantha minax*
79. *Backobourkia collina*
80. *Backobourkia heroine*
Ardeidae
81. 25556 *Ardea alba (Great Egret)*
82. 41324 *Ardea modesta (Eastern Great Egret)* IA
83. 24340 *Ardea novaehollandiae (White-faced Heron)*
84. 24341 *Ardea pacifica (White-necked Heron)*
85. 25564 *Nycticorax caledonicus (Rufous Night Heron)*
Artamidae
86. 25566 *Artamus cinereus (Black-faced Woodswallow)*
87. 24355 *Artamus minor (Little Woodswallow)*
88. 24356 *Artamus personatus (Masked Woodswallow)*
Asparagaceae
89. 1207 *Acanthocarpus parviflorus* P3
90. 1208 *Acanthocarpus preissii*
91. 1209 *Acanthocarpus robustus*
92. 20797 *Acanthocarpus sp. Ajana (C.A. Gardner 8596)*
93. 1280 *Chamaescilla corymbosa (Blue Squill)*
94. 11299 *Chamaescilla corymbosa var. corymbosa*
95. 1308 *Laxmannia sessiliflora (Nodding Lily)*
96. 11732 *Laxmannia sessiliflora subsp. sessiliflora*
97. 1312 *Sowerbaea laxiflora (Purple Tassels)*
98. 1338 *Thysanotus manglesianus (Fringed Lily)*
99. 1343 *Thysanotus patersonii*
100. 1347 *Thysanotus ramulosus*
101. 29482 *Thysanotus sp. Kalbarri (D. & B. Bellairs 1523 A)* P2
102. 1356 *Thysanotus teretifolius*
Asphodelaceae
103. 1364 *Asphodelus fistulosus (Onion Weed)* Y

Asteraceae

104. 7814 *Actinobole condensatum*
105. 7827 *Angianthus cunninghamii (Coast Angianthus)*
106. 7830 *Angianthus microcephalus (Small-headed Angianthus)* P2
107. 7838 *Arctotheca calendula (Cape Weed)* Y
108. 7856 *Blennospora drummondii*
109. 7878 *Brachyscome iberidifolia*
110. 7891 *Calocephalus francisii (Fine-leaf Beauty-heads)*
111. 7916 *Centaurea melitensis (Maltese Cockspur)* Y
112. 7918 *Centipeda cunninghamii (Common Sneezewood)*
113. 7922 *Cephalipterum drummondii (Pompom Head)*
114. 7934 *Chthonocephalus tomentellus* P2
115. 7944 *Cotula bipinnata (Ferny Cotula)* Y
116. 7945 *Cotula coronopifolia (Waterbuttons)* Y
117. 7946 *Cotula cotuloides (Smooth Cotula)*
118. 8002 *Gnephosis tenuissima*
119. 8008 *Helianthus annuus (Sunflower)* Y
120. 8045 *Helipterum craspedioides (Yellow Billy Buttons)*
121. 12741 *Hyalosperma cotula*
122. 8086 *Hypochaeris glabra (Smooth Catsear)* Y
123. 13289 *Lawrencella davenportii*
124. 13284 *Lawrencella rosea*
125. 8114 *Myriocephalus appendiculatus (White-tip Myriocephalus)*
126. 8127 *Olearia axillaris (Coastal Daisybush)*
127. 8136 *Olearia homolepis*
128. 8148 *Olearia revoluta*
129. 42024 *Olearia sp. Kennedy Range (G. Byrne 66)*
130. 8172 *Podolepis canescens (Bright Podolepis, Grey Podolepis)*
131. 8173 *Podolepis capillaris (Wiry Podolepis)*
132. 8177 *Podolepis lessonii*
133. 8184 *Podotheca gnaphalioides (Golden Long-heads)*
134. 8188 *Pogonolepis stricta*
135. 13255 *Pterochaeta paniculata*
136. 8195 *Quinetia urvillei*
137. 8197 *Reichardia tingitana (False Sowthistle)* Y
138. 13241 *Rhodanthe chlorocephala subsp. rosea*
139. 13300 *Rhodanthe citrina*
140. 13291 *Rhodanthe condensata*
141. 13249 *Rhodanthe oppositifolia subsp. oppositifolia*
142. 13254 *Rhodanthe stricta*
143. 8200 *Schoenia cassiniana (Schoenia)*
144. 20161 *Senecio pinnatifolius*
145. 25884 *Senecio pinnatifolius var. latilobus*
146. 8225 *Siloxerus humifusus (Procumbent Siloxerus)*
147. 8231 *Sonchus oleraceus (Common Sowthistle)* Y
148. 8254 *Urospermum picroides (False Hawkbit)* Y
149. 38388 *Ursinia anthemoides subsp. anthemoides* Y
150. 8257 *Vellereophyton dealbatum (White Cudweed)* Y
151. 8268 *Vittadinia humerata*
152. 8275 *Waitzia acuminata (Orange Immortelle)*
153. 13330 *Waitzia acuminata var. albicans*

154. 8281 *Waitzia podolepis*
Baetidae
155. *Cloeon sp.*
156. *Cloeon sp. 2 (SFM)*
Balaenopteridae
157. 24051 *Megaptera novaeangliae (Humpback Whale)* T
Barychelidae
158. *Idiommata blackwalli*
Batrachoididae
159. *Halophryne ocellatus*
Blenniidae
160. *Istiblennius meleagris*
161. *Petroscirtes breviceps*
Boidae
162. 25241 *Antaresia stimsoni subsp. stimsoni (Stimson's Python)*
Boraginaceae
163. 17485 *Halgania anagalloides*
164. 10904 *Halgania bebrana*
165. 6696 *Halgania sericiflora*
166. 6707 *Heliotropium curassavicum (Smooth Heliotrope)*
Boryaceae
167. 1273 *Borya sphaerocephala (Pincushions)*
Bothriuridae
168. *Cercophonius granulosus*
Brachionidae
169. *Brachionus cf. nilsoni (SAP)* Y
170. *Brachionus quadridentatus cluniorbicularis*
Brassicaceae
171. 3000 *Brassica tournefortii (Mediterranean Turnip)* Y
172. 3030 *Lepidium lyratogynum*
173. 3070 *Sisymbrium irio (London Rocket)* Y
174. 3076 *Stenopetalum filifolium*
175. 19403 *Stenopetalum gracile*
Burhinidae
176. 24359 *Burhinus grallarius (Bush Stone-curlew)*
Buthidae
177. *Isometroides vescus*
178. *Urodacus hartmeyeri*
Caenidae
179. *Tasmanocoenis tillyardi*
Campanulaceae
180. 7396 *Isotoma hypocrateriformis (Woodbridge Poison)*
181. 9289 *Lobelia anceps (Angled Lobelia)*
182. 7403 *Lobelia heterophylla (Wing-seeded Lobelia)*
183. 7384 *Wahlenbergia capensis (Cape Bluebell)* Y
184. 7389 *Wahlenbergia preissii*
Campephagidae
185. 25568 *Coracina novaehollandiae (Black-faced Cuckoo-shrike)*
Capparaceae
186. 2981 *Capparis spinosa*
187. 11670 *Capparis spinosa var. nummularia (Coastal Caper)*

Carphodactylidae
188. 24967 *Nephrurus levis subsp. levis*
189. 24968 *Nephrurus levis subsp. occidentalis*
Caryophyllaceae
190. 2891 *Corrigiola litoralis (Strapwort)* Y
191. 2905 *Polycarpon tetraphyllum (Fourleaf Allseed)* Y
192. 2906 *Sagina apetala (Annual Pearlwort)* Y
193. 2908 *Sagina maritima* Y
194. 2909 *Silene gallica (French Catchfly)* Y
195. 2915 *Spergularia rubra (Sand Spurry)* Y
196. 2918 *Stellaria media (Chickweed)* Y
Castniidae
197. 33992 *Synemon gratiosa (Graceful Sunmoth)* P4
Casuariidae
198. 24470 *Dromaius novaehollandiae (Emu)*
Casuarinaceae
199. 1721 *Allocasuarina campestris*
200. 1731 *Allocasuarina huegeliana (Rock Sheoak, Kwowl)*
201. 1732 *Allocasuarina humilis (Dwarf Sheoak)*
202. 1742 *Casuarina obesa (Swamp Sheoak, Kuli)*
Celastraceae
203. 4730 *Stackhousia dielsii (Yellow Stackhousia)*
204. 4734 *Stackhousia muricata*
205. 9070 *Stackhousia pubescens (Downy Stackhousia)*
206. 43541 *Stackhousia sp. Hairy fruited (E.N.S. Jackson 1387)*
207. 43601 *Stackhousia sp. Mid west coastal (D. & B. Bellairs 6561)*
208. 4737 *Tripterococcus brunonis (Winged Stackhousia)*
Centrolepidaceae
209. 1121 *Centrolepis aristata (Pointed Centrolepis)*
210. 13121 *Centrolepis cephaloformis subsp. murrayi* P3
211. 1125 *Centrolepis drummondiana*
212. 1126 *Centrolepis eremica*
213. 1132 *Centrolepis mutica*
214. 1133 *Centrolepis pilosa*
215. 1134 *Centrolepis polygyna (Wiry Centrolepis)*
Centropagidae
216. *Boeckella sp.*
Ceratopogonidae
217. *Bezzia sp. 2*
218. *Bezzia sp. 2 (SAP)*
219. *Culicoides sp.*
220. *Nilobezzia sp. 2*
221. *Nilobezzia sp. 2 (SAP)*
Charadriidae
222. 25575 *Charadrius leschenaultii (Greater Sand Plover)* IA
223. 25576 *Charadrius mongolus (Lesser Sand Plover)* T
224. 24377 *Charadrius ruficapillus (Red-capped Plover)*
225. 24383 *Pluvialis squatarola (Grey Plover)* IA
226. 24386 *Vanellus tricolor (Banded Lapwing)*
Cheluidae
227. 43380 *Chelodina colliei (Oblong Turtle)*

Chenopodiaceae
228. 2450 *Atriplex amnicola (Swamp Saltbush)*
229. 2452 *Atriplex cinerea (Grey Saltbush)*
230. 2463 *Atriplex isatidea (Coast Saltbush)*
231. 11698 *Atriplex paludosa subsp. moquiniana*
232. 2504 *Dysphania plantaginella*
233. 2511 *Enchylaena tomentosa (Barrier Saltbush)*
234. 12064 *Enchylaena tomentosa var. tomentosa (Barrier Saltbush)*
235. 11728 *Rhagodia latifolia subsp. latifolia*
236. 11316 *Rhagodia latifolia subsp. recta*
237. 11240 *Rhagodia preissii subsp. obovata*
238. 11254 *Rhagodia preissii subsp. preissii*
239. 2593 *Sarcocornia quinqueflora (Beaded Samphire)*
240. 2633 *Sclerolaena uniflora (Two-spined Saltbush)*
241. 33319 *Tecticornia indica subsp. bidens*
242. 2644 *Threlkeldia diffusa (Coast Bonefruit)*
Chironomidae
243. *Botryocladius petrophilus*
244. *Chironomus aff. alternans (V24)*
245. *Chironomus aff. alternans (V24) (CB)*
246. *Cladotanytarsus sp. A*
247. *Cladotanytarsus sp. A (SAP)*
248. *Coelopynia pruinosa*
249. *Cricotopus 'brevicornis'*
250. *Cricotopus albitarsus*
251. *Cryptochironomus griseidorsum*
252. *Dicrotendipes jobetus*
253. *Harrisius sp. B* Y
254. *Larsia ? albiceps*
255. *Larsia albiceps*
256. *Nanocladius sp. 1 (VCD7)*
257. *Paracladopelma sp. A (nr M2)*
258. *Paracladopelma sp. A (nr M2) (SAP)*
259. *Polypedilum leei*
260. *Polypedilum watsoni*
261. *Procladius paludicola*
262. *Procladius sp. (normal claws)*
263. *Skusella/"V12 ex-WA" (Cranston)*
264. *Stenochironomus sp.* Y
265. *Tanytarsus bispinosus*
266. *Tanytarsus fuscithorax/semibarbitarsus*
267. *Tanytarsus sp. H*
268. *Tanytarsus sp. H (SAP)*
Chnoosporaceae
269. 27226 *Rosenvingea orientalis*
Chydoridae
270. *Euryalona orientalis*
271. *Pleuroxus cf. foveatus (SAP)*
272. *Pleuroxus foveatus*
Cladophoraceae
273. 26650 *Cladophora coelothrix*

Clupeidae
274. *Hyperlophus vittatus*
275. *Nematalosa vlaminghi*
Coenagrionidae
276. *Ischnura heterosticta heterosticta*
277. *Pseudagrion microcephalum*
278. *Xanthagrion erythroneurum*
Colchicaceae
279. 1386 *Burchardia rosea*
280. 1393 *Wurmbea dilatata*
281. 12072 *Wurmbea dioica subsp. alba*
282. 1398 *Wurmbea monantha*
283. 1399 *Wurmbea murchisoniana* P4
Columbidae
284. 24399 *Columba livia (Domestic Pigeon)* Y
285. 24401 *Geopelia cuneata (Diamond Dove)*
286. 25585 *Geopelia striata (Zebra Dove)*
287. 24403 *Geopelia striata subsp. placida (Peaceful Dove)*
288. 24407 *Ocyphaps lophotes (Crested Pigeon)*
289. 24409 *Phaps chalcoptera (Common Bronzewing)*
290. 25590 *Streptopelia senegalensis (Laughing Turtle-Dove)* Y
Commelinaceae
291. 1162 *Cartonema philydroides*
Convolvulaceae
292. 6609 *Bonamia rosea (Felty Bellflower)*
293. 6614 *Convolvulus remotus*
294. 6663 *Cuscuta epithymum (Lesser Dodder, Greater Dodder)* Y
295. 11021 *Cuscuta planiflora* Y
296. 31334 *Duperreya sericea*
297. 6658 *Wilsonia backhousei (Narrow-leaf Wilsonia)*
Corallinaceae
298. 26458 *Amphiroa anceps*
299. 26463 *Amphiroa gracilis*
300. 13141 *Haliptilon roseum*
301. 27067 *Metagoniolithon chara*
Corixidae
302. *Micronecta annae illiesi*
Corvidae
303. 24416 *Corvus bennetti (Little Crow)*
304. 25592 *Corvus coronoides (Australian Raven)*
Cracticidae
305. 24420 *Cracticus nigrogularis (Pied Butcherbird)*
306. 25595 *Cracticus tibicen (Australian Magpie)*
307. 25596 *Cracticus torquatus (Grey Butcherbird)*
Crassulaceae
308. 17701 *Crassula closiana*
309. 11563 *Crassula colorata var. colorata*
Cuculidae
310. 25598 *Cacomantis flabelliformis (Fan-tailed Cuckoo)*
311. 24427 *Cacomantis flabelliformis subsp. flabelliformis (Fan-tailed Cuckoo)*
312. 42307 *Cacomantis pallidus (Pallid Cuckoo)*

313. 24431 *Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*

Cupressaceae

314. 36560 *Callitris arenaria (Sandplain Cypress)*

Cyperaceae

315. 741 *Baumea articulata (Jointed Rush)*
316. 743 *Baumea juncea (Bare Twigrush)*
317. 794 *Cyperus gymnocaulos (Spiny Flat-sedge)*
318. 20216 *Ficinia nodosa (Knotted Club Rush)*
319. 907 *Gahnia trifida (Coast Saw-sedge)*
320. 917 *Isolepis marginata (Coarse Club-rush)*
321. 930 *Lepidosperma costale*
322. 943 *Lepidosperma rupestre (Kalbarri Lepidosperma)* P4
323. 944 *Lepidosperma scabrum*
324. 945 *Lepidosperma squamatum*
325. 947 *Lepidosperma tenue*
326. 954 *Mesomelaena preissii*
327. 955 *Mesomelaena pseudostygia*
328. 992 *Schoenus grandiflorus (Large Flowered Bogrush)*
329. 998 *Schoenus latitans*
330. 1002 *Schoenus nanus (Tiny Bog Rush)*
331. 1009 *Schoenus pleiostemoneus*
332. 16254 *Schoenus sp. G Broad Sheath (K.L. Wilson 2633)*
333. 1035 *Tetraria microcarpa*

Cyprididae

334. *Alboa worooa*
335. *Candonocypris novaezelandiae*
336. *Cypretta baylyi*
337. *Cypricercus sp. 415*
338. *Cypricercus sp. 415 'humped' (CB)*

Cystoseiraceae

339. 26586 *Caulocystis uvifera*
340. 27090 *Myriodesma quercifolium*

Cyzicidae

341. *Caenestheria sp. nov. a (nr. lutraria) (SAP)*

Daphniidae

342. *Daphnia queenslandensis*

Dasyuridae

343. 24092 *Dasyurus geoffroii (Chuditch, Western Quoll)* T
344. 24109 *Sminthopsis dolichura (Little long-tailed Dunnart)*
345. 24112 *Sminthopsis granulipes (White-tailed Dunnart)*

Dicaeidae

346. 25607 *Dicaeum hirundinaceum (Mistletoebird)*

Dicruridae

347. 24443 *Grallina cyanoleuca (Magpie-lark)*
348. 24452 *Rhipidura fuliginosa subsp. preissi (Grey Fantail)*
349. 25614 *Rhipidura leucophrys (Willie Wagtail)*

Dictyotaceae

350. 27373 *Zonaria turneriana*

Dilleniaceae
351. 5108 *Hibbertia acerosa (Needle Leaved Guinea Flower)*
352. 5115 *Hibbertia conspicua (Leafless Hibbertia)*
353. 5120 *Hibbertia desmophylla*
354. 19685 *Hibbertia glabrisepala*
355. 5135 *Hibbertia hypericoides (Yellow Buttercups)*
356. 5158 *Hibbertia potentilliflora*
357. 5171 *Hibbertia spicata*
358. 11461 *Hibbertia spicata subsp. leptotheca* P3
359. 11481 *Hibbertia spicata subsp. spicata*
Dioscoreaceae
360. 1509 *Dioscorea hastifolia (Warrine, Wararn)*
Diplodactylidae
361. 24919 *Crenadactylus ocellatus subsp. horni (Clawless Gecko)*
362. 24918 *Crenadactylus ocellatus subsp. ocellatus (Clawless Gecko)*
363. 24938 *Diplodactylus ornatus*
364. 42414 *Lucasium alboguttatum*
365. 25518 *Strophurus spinigerus*
366. 24942 *Strophurus spinigerus subsp. spinigerus*
Diptera
367. *Diptera sp.*
Droseraceae
368. 3098 *Drosera glanduligera (Pimpernel Sundew)*
369. 8910 *Drosera humilis*
370. 14298 *Drosera macrantha subsp. macrantha*
371. 11246 *Drosera neesii subsp. borealis*
372. 29177 *Drosera prostrata*
373. 3127 *Drosera radicans*
374. 3128 *Drosera ramellosa (Branched Sundew)*
375. 3129 *Drosera rechingeri*
Dytiscidae
376. *Batrachomatus wingi*
377. *Hyphydrus elegans*
378. *Laccophilus sharpi*
379. *Necterosoma regulare*
Ecdeiocoleaceae
380. 1066 *Ecdeiocolea monostachya*
Elapidae
381. 42381 *Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*
382. 25296 *Demansia psammophis subsp. reticulata (Yellow-faced Whipsnake)*
383. 25251 *Echiopsis curta (Bardick)*
384. 25366 *Hydrophis elegans (Elegant Seasnake, Bar-bellied Seasnake)*
385. 44656 *Hydrophis major*
386. 25248 *Neelaps bimaculatus (Black-naped Snake)*
387. 25253 *Parasuta gouldii*
388. 25261 *Pseudechis australis (Mulga Snake)*
389. 42416 *Pseudonaja mengdeni (Western Brown Snake)*
390. 25263 *Pseudonaja modesta (Ringed Brown Snake)*
391. 25266 *Simoselaps bertholdi (Jan's Banded Snake)*
392. 25267 *Simoselaps littoralis (West Coast Banded Snake)*
Emblingiaceae

393. 2989 *Emblingia calceoliflora*

Ericaceae

394. 6328 *Astroloma glaucescens*
395. 6336 *Astroloma serratifolium (Kondrung)*
396. 43109 *Conostephium laeve*
397. 6376 *Leucopogon cordifolius (Heart-leaf Beard-heath)*
398. 6403 *Leucopogon hispidus*
399. 6430 *Leucopogon planifolius*
400. 19577 *Leucopogon sp. Kalbarri (J.M. Powell 1695)*
401. 6448 *Leucopogon strongylophyllus*
402. 34736 *Lysinema pentapetalum*

Estrilidae

403. 30870 *Taeniopygia guttata (Zebra Finch)*

Euphorbiaceae

404. 4582 *Adriana quadripartita (Bitter Bush)*
405. 4583 *Adriana tomentosa*
406. 17422 *Adriana tomentosa var. tomentosa*
407. 34237 *Beyeria cinerea subsp. borealis*
408. 34236 *Beyeria cinerea subsp. cinerea* P3
409. 4599 *Beyeria lepidopetala (Short-petalled Beyeria)* T
410. 42868 *Euphorbia philochalix*
411. 4644 *Euphorbia sharkoensis*
412. 12097 *Euphorbia tannensis subsp. eremophila (Desert Spurge)*
413. 19584 *Monotaxis bracteata*
414. 4713 *Stachystemon axillaris (Leafy Stachystemon)*
415. 19953 *Stachystemon nematophorus* P4

Fabaceae

416. 3199 *Acacia acuaria*
417. 3200 *Acacia acuminata (Jam, Mangard)*
418. 3216 *Acacia andrewsii*
419. 3225 *Acacia ashbyae*
420. 3238 *Acacia bidentata*
421. 3242 *Acacia blakelyi*
422. 15472 *Acacia cavealis*
423. 3262 *Acacia cochlearis (Rigid Wattle)*
424. 3269 *Acacia coolgardiensis (Spinifex Wattle)*
425. 3323 *Acacia ericifolia*
426. 14077 *Acacia gelasina* P2
427. 3376 *Acacia idiomorpha*
428. 11611 *Acacia lasiocarpa var. lasiocarpa*
429. 3412 *Acacia latipes*
430. 11448 *Acacia leptospermoides subsp. leptospermoides*
431. 15477 *Acacia lineolata subsp. lineolata*
432. 15290 *Acacia neurophylla subsp. erugata*
433. 3466 *Acacia oldfieldii*
434. 3474 *Acacia oxyclada*
435. 16142 *Acacia puncticulata*
436. 3508 *Acacia quadrisulcata*
437. 19499 *Acacia ramulosa var. ramulosa*
438. 3515 *Acacia restiacea*
439. 3525 *Acacia rostellifera (Summer-scented Wattle)*

440. 3527 *Acacia saligna (Orange Wattle, Kudjong)*
441. 3532 *Acacia scirpifolia*
442. 3546 *Acacia signata*
443. 3549 *Acacia spathulifolia*
444. 12268 *Acacia sphenophylla*
445. 14145 *Acacia stereophylla var. cylindrata* P2
446. 3577 *Acacia tetragonophylla (Kurara, Wakalpuka)*
447. 3587 *Acacia ulicina*
448. 3604 *Acacia xanthina (White-stemmed Wattle)*
449. 3691 *Aotus phylicoides*
450. 30232 *Bossiaea calcicola* P3
451. 30231 *Bossiaea inundata* P2
452. 3718 *Bossiaea rufa*
453. 3719 *Bossiaea spinescens*
454. 35839 *Cristonia stenophylla*
455. 17118 *Cullen leucanthum*
456. 11879 *Daviesia hakeoides subsp. hakeoides*
457. 16585 *Daviesia nudiflora subsp. nudiflora*
458. 3833 *Daviesia podophylla*
459. 14986 *Daviesia ramosissima*
460. 20473 *Gastrolobium ebracteolatum*
461. 3912 *Gastrolobium oxylobioides (Champion Bay Poison)*
462. 3938 *Glycine canescens (Silky Glycine)*
463. 19215 *Gompholobium glutinosum*
464. 3957 *Gompholobium tomentosum (Hairy Yellow Pea)*
465. 3970 *Indigofera australis (Australian Indigo)*
466. 40320 *Indigofera australis subsp. hesperia*
467. 19700 *Isotropis cuneifolia subsp. cuneifolia*
468. 3998 *Jacksonia angulata*
469. 14780 *Jacksonia arenicola*
470. 14783 *Jacksonia calcicola*
471. 4006 *Jacksonia cupulifera*
472. 14785 *Jacksonia rigida*
473. 4033 *Jacksonia velutina* P4
474. 3664 *Labichea cassioides*
475. 3667 *Labichea lanceolata (Tall Labichea)*
476. 11289 *Labichea lanceolata subsp. lanceolata*
477. 15428 *Leptosema aphyllum*
478. 16489 *Leptosema macrocarpum*
479. 17640 *Leptosema tomentosum*
480. 4060 *Lotus australis (Austral Trefoil)*
481. 4079 *Medicago polymorpha (Burr Medic)* Y
482. 4085 *Melilotus indicus* Y
483. 41444 *Mirbelia balsiformis*
484. 41442 *Mirbelia corallina* P3
485. 4097 *Mirbelia ramulosa*
486. 4100 *Mirbelia spinosa*
487. 4104 *Mirbelia trichocalyx*
488. 18444 *Senna charlesiana*
489. 12305 *Senna glutinosa subsp. chatelainiana*
490. 4203 *Sphaerolobium gracile*

491. 4220 *Swainsona canescens (Grey Swainsona)*
492. 4256 *Templetonia retusa (Cockies Tongues)*
493. 4292 *Trifolium campestre (Hop Clover)* Y
494. 4325 *Viminaria juncea (Swishbush, Koweda)*

Falconidae

495. 25621 *Falco berigora (Brown Falcon)*
496. 25622 *Falco cenchroides (Australian Kestrel)*
497. 25623 *Falco longipennis (Australian Hobby)*

Frankeniaceae

498. 5193 *Frankenia confusa* P4
499. 5209 *Frankenia pauciflora (Seaheath)*

Galaxauraceae

500. 27340 *Tricleocarpa cylindrica*

Galeommatidae

501. *Arthritica semen*

Gekkonidae

502. 24959 *Gehyra variegata*
503. 24961 *Heteronotia binoei (Bynoe's Gecko)*

Gelidiaceae

504. 27195 *Pterocladia lucida*

Gentianaceae

505. 6542 *Centaurium tenuiflorum* Y
506. 41660 *Schenkia australis*

Geraniaceae

507. 4333 *Erodium cicutarium (Common Storksbill)* Y
508. 4335 *Erodium cygnorum (Blue Heronsbill)*

Gerreidae

509. *Gerres subfasciatus*

Gerridae

510. *Limnogonus sp.*

Gobiidae

511. *Pseudogobius olorum*

Gomphidae

512. *Austroepigomphus (Xerogomphus) gordoni*
513. *Austrogomphus gordoni* Y

Goodeniaceae

514. 7421 *Dampiera altissima (Tall Dampiera)*
515. 11326 *Dampiera incana var. fuscescens*
516. 11723 *Dampiera incana var. incana*
517. 7453 *Dampiera lindleyi*
518. 18441 *Dampiera sp. Jurien (G. Lullfitz s.n. 10/7/1986)* P2
519. 7475 *Dampiera spicigera (Spiked Dampiera)*
520. 7495 *Goodenia berardiana*
521. 29362 *Goodenia coerulea*
522. 17806 *Goodenia drummondii subsp. drummondii*
523. 7513 *Goodenia hassallii*
524. 7538 *Goodenia pulchella*
525. 7570 *Lechenaultia chlorantha (Kalbarri Leschenaultia)* T
526. 7574 *Lechenaultia floribunda (Free-flowering Leschenaultia)*
527. 7577 *Lechenaultia hirsuta (Hairy Leschenaultia)*
528. 7580 *Lechenaultia linarioides (Yellow Leschenaultia)*

529. 7588 *Lechenaultia subcymosa (Wide-branching Leschenaultia)*
530. 7593 *Pentaptilon careyi*
531. 7603 *Scaevola canescens (Grey Scaevola)*
532. 7606 *Scaevola crassifolia (Thick-leaved Fan-flower)*
533. 7614 *Scaevola globulifera*
534. 17026 *Scaevola kallophylla* P4
535. 7619 *Scaevola lanceolata*
536. 7634 *Scaevola phlebopetala (Velvet Fanflower)*
537. 7637 *Scaevola porocarya (Striate-fruit Scaevola)*
538. 7643 *Scaevola sericophylla*
539. 20449 *Scaevola sp. Golden hairs (D. & B. Bellairs 1450 A)* P1 Y
540. 7644 *Scaevola spinescens (Currant Bush, Maroon)*
541. 13152 *Scaevola thesioides subsp. thesioides*
542. 7648 *Scaevola tomentosa (Raggedleaf Fanflower)*
543. 7658 *Velleia discophora (Cabbage Poison)*
544. 7666 *Verreauxia reinwardtii (Common Verreauxia)*

Gyrinidae

545. *Aulonogyrus strigosus*
546. *Macrogyrus angustatus*

Gyrostemonaceae

547. 2784 *Gyrostemon ramulosus (Corkybark)*
548. 2788 *Gyrostemon subnudus*
549. 2791 *Tersonia cyathiflora (Button Creeper)*

Haematopodidae

550. 25627 *Haematopus fuliginosus (Sooty Oystercatcher)*

Haemodoraceae

551. 11434 *Anigozanthos humilis subsp. humilis*
552. 1410 *Anigozanthos kalbarriensis (Kalbarri Catspaw)*
553. 11565 *Anigozanthos manglesii subsp. quadrans*
554. 1418 *Conostylis aculeata (Prickly Conostylis)*
555. 12028 *Conostylis aculeata subsp. septentrionora*
556. 1427 *Conostylis candicans (Grey Cottonhead)*
557. 11979 *Conostylis candicans subsp. flavifolia*
558. 1446 *Conostylis prolifera (Mat Cottonheads)*
559. 1448 *Conostylis resinosa*
560. 1450 *Conostylis robusta*
561. 1456 *Conostylis stylidioides*
562. 1465 *Haemodorum discolor*
563. 1473 *Haemodorum simulans*

Haemulidae

564. *Plectorhinchus pictus*

Halcyonidae

565. 25549 *Todiramphus sanctus (Sacred Kingfisher)*

Haloragaceae

566. 33620 *Glischrocaryon angustifolium*
567. 6143 *Glischrocaryon aureum (Common Popflower)*
568. 6144 *Glischrocaryon flavescens*
569. 6148 *Gonocarpus confertifolius*
570. 11801 *Gonocarpus confertifolius var. helmsii*
571. 6180 *Haloragis trigonocarpa*

Hemerocallidaceae
572. 1262 *Arnocrinum drummondii* P3
573. 11834 *Corynotheca micrantha var. acanthoclada*
574. 11283 *Corynotheca micrantha var. micrantha*
575. 1259 *Dianella revoluta (Blueberry Lily)*
576. 1260 *Stypandra glauca (Blind Grass)*
577. 1361 *Tricoryne elatior (Yellow Autumn Lily)*
Hemicorduliidae
578. *Hemicordulia tau*
Hemiramphidae
579. *Hyporhamphus regularis*
Hirundinidae
580. 24491 *Hirundo neoxena (Welcome Swallow)*
Hydraenidae
581. *Gymnocthebius sp. 3 (SAP)*
Hydrochidae
582. *Hydrochus lateviridus*
Hydrodromidae
583. *Hydrodromidae sp.*
Hydrophilidae
584. *Berosus australiae*
585. *Helochares tatei*
586. *Hydrophilus sp.*
Hypericaceae
587. 5180 *Hypericum gramineum (Small St John's Wort)*
Ilyocyprididae
588. *Ilyocypris australiensis*
Iridaceae
589. 20154 *Lapeirousia anceps* Y Y
590. 30476 *Patersonia occidentalis var. latifolia*
591. 30472 *Patersonia occidentalis var. occidentalis*
Ixodidae
592. *Amblyomma triguttatum*
Juncaceae
593. 11922 *Juncus kraussii subsp. australiensis*
594. 1188 *Juncus pallidus (Pale Rush)*
Juncaginaceae
595. 33276 *Triglochin isingiana*
596. 147 *Triglochin mucronata*
597. 18587 *Triglochin nana*
Kyphosidae
598. *Kyphosus cornelii*
Labridae
599. *Thalassoma septemfasciata*

Lamiaceae
600. 6760 *Dicrastylis fulva*
601. 6837 *Hemiandra leiantha*
602. 6839 *Hemiandra pungens (Snakebush)*
603. 6849 *Hemigenia diplanthera*
604. 6858 *Hemigenia macrantha*
605. 6780 *Lachnostachys eriobotrya (Lambswool)*
606. 6781 *Lachnostachys ferruginea (Rusty Lambstail)*
607. 6811 *Pityrodia hemigenioides*
608. 41041 *Quoya atriplicina*
609. 41063 *Quoya loxocarpa*
610. 41062 *Quoya oldfieldii (Oldfields Foxglove)*
611. 41080 *Quoya verbascina (Golden Bush)*
612. 6939 *Westringia dampieri*
Lamponidae
613. *Lampona cylindrata*
Laridae
614. 25638 *Larus pacificus (Pacific Gull)*
Lauraceae
615. 2948 *Cassytha aurea*
616. 12073 *Cassytha aurea var. aurea*
617. 11351 *Cassytha aurea var. hirta*
618. 2951 *Cassytha flava (Dodder Laurel)*
619. 2956 *Cassytha pomiformis (Dodder Laurel)*
620. 2957 *Cassytha racemosa (Dodder Laurel)*
621. 11799 *Cassytha racemosa forma racemosa*
Lecanidae
622. *Lecane ludwigii*
623. *Lecane rhytida*
Leptoceridae
624. *Notalina spira*
625. *Notoperata sp.*
626. *Oecetis sp.*
627. *Triaenodes sp.*
628. *Triaenodes sp. P1=P2 (PSW)*
629. *Triplectides australis*
Leptophlebiidae
630. *Nyungara sp.*
Lethrinidae
631. *Lethrinus nebulosus*
Libellulidae
632. *Orthetrum caledonicum*
633. *Trapezostigma loewii*
Limnodynastidae
634. 25408 *Heleioporus albopunctatus (Western Spotted Frog)*
635. 25412 *Heleioporus psammophilus (Sand Frog)*
636. 25415 *Limnodynastes dorsalis (Western Banjo Frog)*
637. 25425 *Neobatrachus kunapalari (Kunapalari Frog)*
638. 25426 *Neobatrachus pelobatoides (Humming Frog)*

Loganiaceae
639. 16798 *Logania litoralis*
640. 6512 *Logania spermacocea*
Loranthaceae
641. 13267 *Amyema linophylla subsp. linophylla*
642. 2378 *Amyema melaleucae*
643. 2401 *Nuytsia floribunda (Christmas Tree, Mudja)*
Lycosidae
644. *Hoggicosa castanea*
645. *Lycosa australicola*
646. *Lycosa godeffroyi*
647. *Tasmanicosa leuckartii*
648. *Venator immansueta*
Macropodidae
649. 24131 *Macropus eugenii subsp. derbianus (Tammar Wallaby (WA subsp))* P5
650. 24132 *Macropus fuliginosus (Western Grey Kangaroo)*
Maluridae
651. 25651 *Malurus lamberti (Variegated Fairy-wren)*
652. 24544 *Malurus lamberti subsp. assimilis (Variegated Fairy-wren)*
653. 25652 *Malurus leucopterus (White-winged Fairy-wren)*
654. 24549 *Malurus leucopterus subsp. leuconotus (White-winged Fairy-wren)*
655. 24551 *Malurus pulcherrimus (Blue-breasted Fairy-wren)*
656. 25654 *Malurus splendens (Splendid Fairy-wren)*
Malvaceae
657. 4904 *Alyogyne cuneiformis (Coastal Hibiscus)*
658. 4905 *Alyogyne hakeifolia*
659. 42940 *Alyogyne sp. Geraldton (R. Davis 3487)*
660. 42921 *Alyogyne sp. Kalbarri (P.G. Wilson 6720)* Y
661. 42960 *Alyogyne sp. Port Gregory (K.F. Kenneally 2382)*
662. 40911 *Androcalva bivillosa* T
663. 40914 *Androcalva gaudichaudii*
664. 4999 *Brachychiton gregorii (Desert Kurrajong, Ngalta)*
665. 40872 *Commersonia borealis*
666. 40922 *Commersonia densiflora*
667. 19600 *Guichenotia basivirida*
668. 19885 *Guichenotia intermedia*
669. 5011 *Guichenotia ledifolia*
670. 5012 *Guichenotia macrantha (Large-flowered Guichenotia)*
671. 17781 *Hannafordia quadrivalvis subsp. quadrivalvis*
672. 4927 *Hibiscus drummondii (Drummond's Hibiscus)*
673. 5022 *Keraudrenia hermanniifolia*
674. 19892 *Keraudrenia velutina subsp. velutina*
675. 9099 *Lasiopetalum angustifolium (Narrow Leaved Lasiopetalum)*
676. 5043 *Lasiopetalum oldfieldii*
677. 17263 *Lasiopetalum oldfieldii subsp. oldfieldii* P3
678. 5044 *Lasiopetalum oppositifolium* P3
679. 4970 *Sida calyxhymenia (Tall Sida)*
Megapodiidae
680. 24557 *Leipoa ocellata (Malleefowl)* T

Meliphagidae
681. 24559 *Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*
682. 24561 *Anthochaera carunculata (Red Wattlebird)*
683. 24564 *Certhionyx variegatus (Pied Honeyeater)*
684. 24567 *Epthianura albifrons (White-fronted Chat)*
685. 24570 *Epthianura tricolor (Crimson Chat)*
686. 25661 *Lichmera indistincta (Brown Honeyeater)*
687. 24582 *Lichmera indistincta subsp. indistincta (Brown Honeyeater)*
688. 42341 *Ptilotula penicillatus (White-plumed Honeyeater)*
689. 42344 *Purnella albifrons (White-fronted Honeyeater)*
Menyanthaceae
690. 36203 *Liparophyllum congestiflorum* P4
Meropidae
691. 24598 *Merops ornatus (Rainbow Bee-eater)* IA
Molluginaceae
692. 2839 *Macarthuria australis*
693. 2841 *Macarthuria intricata* P3
Molossidae
694. 24185 *Tadarida australis (White-striped Freetail-bat)*
Monacanthidae
695. *Monacanthus chinensis*
Monocentrididae
696. *Cleidopus gloriamaris*
Mugilidae
697. *Aldrichetta forsteri*
698. *Liza subviridis*
699. *Mugil cephalus*
Mullidae
700. *Parupeneus spilurus*
Muridae
701. 24223 *Mus musculus (House Mouse)* Y
702. 24224 *Notomys alexis (Spinifex Hopping-mouse)*
703. 24230 *Pseudomys albocinereus (Ash-grey Mouse)*
704. 24245 *Rattus rattus (Black Rat)* Y
Myobatrachidae
705. 41375 *Arenophryne xiphorhyncha (Southern Sandhill Frog)*
706. 25420 *Myobatrachus gouldii (Turtle Frog)*
707. 25433 *Pseudophryne guentheri (Crawling Toadlet)*
Myobiidae
708. *Radfordia notomys*

Myrtaceae

709. 10767 *Baeckea pentagonantha*
710. 5365 *Baeckea robusta*
711. 5368 *Baeckea subcuneata* P2
712. 17761 *Beaufortia aestiva*
713. 5401 *Calothamnus blepharospermus*
714. 34196 *Calothamnus chrysanthereus (Claw Flower)*
715. 35856 *Calothamnus glaber*
716. 5420 *Calothamnus oldfieldii*
717. 35696 *Calothamnus phellosus*
718. 35758 *Calothamnus quadrifidus subsp. homalophyllus (Murchison Clawflower)*
719. 35759 *Calothamnus quadrifidus subsp. obtusus*
720. 5429 *Calothamnus sanguineus (Silky-leaved Blood flower, Pindak)*
721. 5443 *Calytrix brevifolia*
722. 5450 *Calytrix depressa*
723. 5459 *Calytrix formosa* P3
724. 5460 *Calytrix fraseri (Pink Summer Calytrix)*
725. 5464 *Calytrix harvestiana* P2
726. 5465 *Calytrix leschenaultii*
727. 5468 *Calytrix oldfieldii*
728. 5470 *Calytrix paucicostata* P2
729. 5475 *Calytrix purpurea* P2
730. 5476 *Calytrix sapphirina*
731. 5479 *Calytrix strigosa*
732. 42580 *Chamelaucium gracile*
733. 5494 *Chamelaucium marchantii* P3
734. 5498 *Chamelaucium uncinatum (Geraldton Wax)*
735. 5520 *Darwinia oldfieldii*
736. 5534 *Darwinia virescens (Murchison Darwinia)*
737. 29556 *Enekbatus cristatus* P2
738. 5539 *Eremaea ebracteata*
739. 14102 *Eremaea ebracteata var. ebracteata*
740. 12895 *Eucalyptus arachnaea subsp. arachnaea*
741. 9141 *Eucalyptus baudiniana*
742. 35345 *Eucalyptus camaldulensis subsp. obtusa (Blunt-budded River Red Gum)*
743. 15494 *Eucalyptus diminuta*
744. 15804 *Eucalyptus dolichocera*
745. 5638 *Eucalyptus erythrocorys (Illyarrie)*
746. 5640 *Eucalyptus eudesmioides (Malallie, Marlarli)*
747. 5649 *Eucalyptus foecunda (Narrow-leaved Red Mallee)*
748. 5654 *Eucalyptus fruticosa*
749. 5658 *Eucalyptus gittinsii (Northern Sandplain Mallee)*
750. 5673 *Eucalyptus horistes*
751. 5681 *Eucalyptus jucunda (Yuna Mallee)*
752. 20303 *Eucalyptus kochii subsp. borealis*
753. 13018 *Eucalyptus mannensis subsp. vespertina*
754. 5722 *Eucalyptus obtusiflora (Dongara Mallee)*
755. 5725 *Eucalyptus oldfieldii (Oldfield's Mallee)*
756. 5730 *Eucalyptus oraria (Ooragmandee)*
757. 18348 *Eucalyptus pallida*
758. 5761 *Eucalyptus rigidula (Stiff-leaved Mallee)*

759. 29993 *Eucalyptus sp. Kalbarri (M.I.H. Brooker 7937)*
760. 14548 *Eucalyptus victrix*
761. 5861 *Malleostemon hursthousei*
762. 5864 *Malleostemon peltiger*
763. 25905 *Malleostemon sp. Junga Dam (D. Bellairs 942)*
764. 17399 *Malleostemon sp. Yerina (S.J. Patrick 2728)* P1
765. 37580 *Melaleuca acutifolia*
766. 19384 *Melaleuca bisulcata*
767. 5884 *Melaleuca calothamnoides*
768. 19048 *Melaleuca campanae*
769. 5887 *Melaleuca cardiophylla (Tangling Melaleuca)*
770. 5893 *Melaleuca concreta*
771. 5895 *Melaleuca conothamnoides*
772. 5908 *Melaleuca eleuterostachya*
773. 5911 *Melaleuca filifolia (Wiry Honeymyrtle)*
774. 15602 *Melaleuca fulgens subsp. steedmanii*
775. 19049 *Melaleuca idana*
776. 18452 *Melaleuca laetifica*
777. 5922 *Melaleuca lanceolata (Rottnest Teatree, Moonah)*
778. 19522 *Melaleuca lara*
779. 5926 *Melaleuca lateritia (Robin Redbreast Bush)*
780. 5930 *Melaleuca leiopyxis*
781. 18112 *Melaleuca leuropoma*
782. 18435 *Melaleuca longistaminea*
783. 41120 *Melaleuca marginata*
784. 5936 *Melaleuca megacephala*
785. 5945 *Melaleuca oldfieldii* P2
786. 5954 *Melaleuca psammophila*
787. 5958 *Melaleuca radula (Graceful Honeymyrtle)*
788. 5959 *Melaleuca rhaphiophylla (Swamp Paperbark)*
789. 19449 *Melaleuca stereophloia*
790. 5985 *Melaleuca undulata (Hidden Honey-myrtle)*
791. 5987 *Melaleuca viminea (Mohan)*
792. 13280 *Melaleuca viminea subsp. viminea*
793. 37680 *Micromyrtus collina* P1
794. 6008 *Phymatocarpus porphyrocephalus*
795. 20219 *Pileanthus peduncularis subsp. peduncularis*
796. 20229 *Pileanthus peduncularis subsp. pilifer*
797. 18250 *Pileanthus vernicosus*
798. 6029 *Scholtzia capitata*
799. 6035 *Scholtzia leptantha*
800. 14657 *Scholtzia sp. Eradu (R.D. Royce 8016)* P2
801. 14922 *Scholtzia sp. Eurardy (J.S. Beard 6886)* P2
802. 16837 *Scholtzia sp. Kalbarri (N. Hoyle 623)*
803. 20094 *Scholtzia sp. Murchison (M.E. Trudgen 1685)*
804. 16841 *Scholtzia sp. Red Bluff (A. Gunness 2373)*
805. 14659 *Scholtzia sp. Ross Graham Lookout (S. Maley 6)* P2
806. 15427 *Scholtzia spatulata*
807. 6040 *Scholtzia uberiflora*
808. 6041 *Scholtzia umbellifera*
809. 44683 *Thryptomene calcicola* P2 Y

810. 6055 *Thryptomene denticulata*
811. 9194 *Thryptomene johnsonii* P2 Y
812. 16820 *Thryptomene sp. Eagle Gorge (A.G. Gunness 2360)* P2
813. 20366 *Thryptomene sp. Red Bluff (A.G. Gunness 2358)*
814. 19693 *Thryptomene striata* P2
815. 6067 *Thryptomene strongylophylla*
816. 12399 *Verticordia capillaris* P4
817. 14709 *Verticordia chrysostachys var. chrysostachys*
818. 12405 *Verticordia cooloomia* P3
819. 12413 *Verticordia densiflora var. roseostella* P3
820. 12414 *Verticordia densiflora var. stelluligera*
821. 14712 *Verticordia dichroma var. dichroma* P3
822. 12423 *Verticordia etheliana var. formosa*
823. 15622 *Verticordia lepidophylla var. lepidophylla*
824. 6098 *Verticordia monadelpha (Pink Woolly Featherflower)*
825. 12443 *Verticordia monadelpha var. callitricha*
826. 10822 *Verticordia nobilis*
827. 6102 *Verticordia oculata*
828. 6107 *Verticordia pennigera*
829. 6108 *Verticordia pholidophylla*
830. 6109 *Verticordia picta (Painted Featherflower)*
831. 6111 *Verticordia polytricha (Northern Cauliflower)* P4
832. 15615 *Verticordia spicata subsp. spicata*

Naididae

833. *Naididae (ex Tubificidae)*

Nematoda

834. *Nematoda sp.*

Nemesiidae

835. *Aname mainae*

Nicodamidae

836. *Nicodamus mainae*

Nyctaginaceae

837. 2776 *Commicarpus australis (Perennial Tar Vine)*

Oecobiidae

838. *Oecobius navus*

Olacaceae

839. 2364 *Olax aurantia*

Oleaceae

840. 6500 *Jasminum calcareum*

Orchidaceae

841. 18035 *Caladenia bicalliata subsp. bicalliata*
842. 15337 *Caladenia bryceana subsp. cracens* T
843. 1586 *Caladenia discoidea (Dancing Orchid)*
844. 1588 *Caladenia drummondii (Winter Spider Orchid)*
845. 15349 *Caladenia flava subsp. maculata*
846. 15355 *Caladenia hirta subsp. rosea*
847. 15360 *Caladenia longicauda subsp. borealis*
848. 44895 *Caladenia longicauda subsp. minima* P2
849. 17760 *Caladenia nobilis*
850. 15374 *Caladenia pachychila*
851. 15378 *Caladenia reptans subsp. impensa*

852. 18019 *Caladenia vulgata*
853. 1620 *Caladenia wanosa (Kalbarri Spider Orchid)* T
854. 15114 *Cyanicula gemmata*
855. 11049 *Diuris corymbosa*
856. 30432 *Eriochilus dilatatus subsp. brevifolius*
857. 15410 *Eriochilus dilatatus subsp. dilatatus*
858. 8814 *Microtis brownii*
859. 15425 *Prasophyllum calcicola*
860. 41982 *Pterostylis microglossa*
861. 1697 *Pterostylis scabra (Bronze Shell Orchid)*
862. 18657 *Pterostylis sp. inland (A.C. Beauglehole 11880)*
863. 16367 *Pyrorchis nigricans (Red beaks, Elephants ears)*
864. 1701 *Thelymitra antennifera (Vanilla Orchid)*
865. 1702 *Thelymitra campanulata (Shirt Orchid)*
866. 1707 *Thelymitra flexuosa (Twisted Sun Orchid)*

Orobanchaceae

867. 7089 *Parentucellia latifolia (Common Bartsia)* Y

Otididae

868. 24610 *Ardeotis australis (Australian Bustard)*

Oxalidaceae

869. 4355 *Oxalis perennans*

Pachycephalidae

870. 25675 *Colluricincla harmonica (Grey Shrike-thrush)*
871. 24613 *Colluricincla harmonica subsp. rufiventris (Grey Shrike-thrush)*
872. 24618 *Oreoica gutturalis (Crested Bellbird)*
873. 25679 *Pachycephala pectoralis (Golden Whistler)*
874. 24623 *Pachycephala pectoralis subsp. fuliginosa (Golden Whistler)*
875. 25680 *Pachycephala rufiventris (Rufous Whistler)*
876. 24624 *Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*

Parastenocarididae

877. *Parastenocarididae sp.*

Pardalotidae

878. 25682 *Pardalotus striatus (Striated Pardalote)*

Parmeliaceae

879. 28158 *Xanthoparmelia neorimalis*

Pelecanidae

880. 24648 *Pelecanus conspicillatus (Australian Pelican)*

Petroicidae

881. 24650 *Drymodes brunneopygia (Southern Scrub-robin)*
882. 24651 *Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*
883. 25693 *Microeca fascinans (Jacky Winter)*
884. 24658 *Petroica cucullata (Hooded Robin)*
885. 24659 *Petroica goodenovii (Red-capped Robin)*

Phalacrocoracidae

886. 25697 *Phalacrocorax carbo (Great Cormorant)*
887. 24667 *Phalacrocorax sulcirostris (Little Black Cormorant)*
888. 25699 *Phalacrocorax varius (Pied Cormorant)*

Phasianidae

889. 24671 *Coturnix pectoralis (Stubble Quail)*
890. 24674 *Pavo cristatus (Common Peafowl, Indian Peafowl)* Y

Phreodrilidae

891. *Phreodrilidae WA37 (SFM)*

Phyllanthaceae
892. 4675 *Phyllanthus calycinus (False Boronia)*
893. 17626 *Phyllanthus erwinii*
894. 4685 *Phyllanthus scaber*
895. 4688 *Poranthera drummondii*
896. 4691 *Poranthera microphylla (Small Poranthera)*
897. 4706 *Sauropus crassifolius*
Physciaceae
898. 42104 *Buellia albula*
Pinguipedidae
899. *Parapercis haackei*
Pittosporaceae
900. 19421 *Marianthus bicolor (Painted Marianthus)*
901. 19745 *Pittosporum ligustrifolium*
902. 41300 *Pittosporum phillyreoides (Weeping Pittosporum, Yaliti)*
Plantaginaceae
903. 11785 *Plantago coronopus subsp. commutata* Y
904. 7299 *Plantago debilis*
905. 7102 *Stemodia viscosa (Pagurda)*
Pleidae
906. *Paraplea sp.*
Poaceae
907. 184 *Aira caryophyllea (Silvery Hairgrass)* Y
908. 12063 *Aristida holathera var. holathera*
909. 17234 *Austrostipa compressa*
910. 17235 *Austrostipa crinita*
911. 17237 *Austrostipa elegantissima*
912. 17244 *Austrostipa macalpinei*
913. 17246 *Austrostipa nitida*
914. 17251 *Austrostipa scabra*
915. 252 *Bromus madritensis (Madrid Brome)* Y
916. 258 *Cenchrus ciliaris (Buffel Grass)* Y
917. 259 *Cenchrus echinatus (Burrgrass)* Y
918. 41568 *Cenchrus setaceus (Fountain Grass)* Y
919. 267 *Chloris gayana (Rhodes Grass)* Y
920. 283 *Cynodon dactylon (Couch)* Y
921. 11485 *Ehrharta brevifolia var. cuspidata* Y
922. 349 *Ehrharta longiflora (Annual Veldt Grass)* Y
923. 370 *Eragrostis barrelieri* Y
924. 376 *Eragrostis curvula (African Lovegrass)* Y
925. 378 *Eragrostis dielsii (Mallee Lovegrass)*
926. 400 *Eriachne aristidea*
927. 8476 *Hordeum hystrix (Mediterranean Region Barley Grass)* Y
928. 468 *Lamarckia aurea (Goldentop)* Y
929. 492 *Neurachne alopecuroidea (Foxtail Mulga Grass)*
930. 11232 *Paractaenum novae-hollandiae subsp. novae-hollandiae*
931. 516 *Parapholis incurva (Coast Barbgrass)* Y
932. 518 *Paspalidium clementii (Clements Paspalidium)*
933. 528 *Paspalum distichum (Water Couch)* Y
934. 40424 *Pentameris airoides subsp. airoides* Y
935. 551 *Phalaris minor (Lesser Canary Grass)* Y

936. 582 *Polypogon monspeliensis (Annual Beardgrass)* Y
937. 10970 *Rostraria cristata* Y
938. 11151 *Rostraria pumila* Y
939. 606 *Setaria dielsii (Diels' Pigeon Grass)*
940. 625 *Spinifex longifolius (Beach Spinifex)*
941. 635 *Sporobolus virginicus (Marine Couch)*
942. 673 *Themeda triandra*
943. 17885 *Triodia bromoides* P4
944. 17882 *Triodia danthonioides*
945. 17880 *Triodia dielsii* P3

Podargidae

946. 25703 *Podargus strigoides (Tawny Frogmouth)*

Podicipedidae

947. 25704 *Podiceps cristatus (Great Crested Grebe)*
948. 24681 *Poliocephalus poliocephalus (Hoary-headed Grebe)*
949. 25705 *Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*

Polygalaceae

950. 4550 *Comesperma calymega (Blue-spike Milkwort)*
951. 4555 *Comesperma integerrimum*
952. 4561 *Comesperma scoparium (Broom Milkwort)*

Polygonaceae

953. 17739 *Acetosa vesicaria* Y
954. 2409 *Emex australis (Doublegee)* Y
955. 2412 *Muehlenbeckia adpressa (Climbing Lignum)*

Pomacentridae

956. *Abudefduf sordidus*

Pomatomidae

957. *Pomatomus saltatrix*

Pomatostomidae

958. 24683 *Pomatostomus superciliosus (White-browed Babbler)*

Portulacaceae

959. 2848 *Calandrinia corrigioloides (Strap Purslane)*
960. 2854 *Calandrinia granulifera (Pygmy Purslane)*
961. 2856 *Calandrinia liniflora (Parakeelya)*
962. 2860 *Calandrinia polyandra (Parakeelya)*
963. 2861 *Calandrinia polypetala*
964. 2867 *Calandrinia remota*

Primulaceae

965. 36375 *Lysimachia arvensis (Pimpernel)* Y
966. 6484 *Samolus repens (Creeping Brookweed)*

Procellariidae

967. 24692 *Pachyptila belcheri (Slender-billed Prion)*

Proteaceae

968. 11837 *Adenanthos cygnorum subsp. cygnorum (Common Woollybush)*
969. 1799 *Banksia ashbyi (Ashby's Banksia)*
970. 1800 *Banksia attenuata (Slender Banksia, Piara)*
971. 32627 *Banksia borealis subsp. borealis*
972. 32524 *Banksia fraseri var. ashbyi*
973. 1829 *Banksia lindleyana (Porcupine Banksia)*
974. 1834 *Banksia menziesii (Firewood Banksia)*
975. 1842 *Banksia prionotes (Acorn Banksia)*

976. 32079 *Banksia sessilis var. flabellifolia*
977. 1855 *Banksia victoriae (Woolly Orange Banksia)*
978. 15608 *Conospermum acerosum subsp. hirsutum*
979. 15511 *Conospermum boreale*
980. 15513 *Conospermum boreale subsp. boreale*
981. 16849 *Conospermum microflorum*
982. 1882 *Conospermum stoechadis (Common Smokebush)*
983. 15611 *Conospermum stoechadis subsp. stoechadis (Common Smokebush)*
984. 1885 *Conospermum triplinervium (Tree Smokebush)*
985. 1954 *Grevillea annulifera (Prickly Plume Grevillea)*
986. 1956 *Grevillea argyrophylla (Silvery-leaved Grevillea)*
987. 15763 *Grevillea biformis subsp. biformis*
988. 1966 *Grevillea brachystachya (Short-spiked Grevillea)*
989. 1973 *Grevillea candelabroides*
990. 8831 *Grevillea commutata*
991. 18116 *Grevillea commutata subsp. commutata*
992. 18130 *Grevillea commutata subsp. pinnatisecta*
993. 2001 *Grevillea eriostachya (Flame Grevillea, Kaliny-kalinypa)*
994. 8832 *Grevillea excelsior (Flame Grevillea)*
995. 13430 *Grevillea hakeoides subsp. stenophylla*
996. 2023 *Grevillea intricata*
997. 2031 *Grevillea leucoclada* P3
998. 2032 *Grevillea leucopteris (White Plume Grevillea)*
999. 8838 *Grevillea pinaster*
1000. 2097 *Grevillea stenomera (Lace Net Grevillea)* P2
1001. 2109 *Grevillea trachytheca (Rough-fruit Grevillea)*
1002. 2136 *Hakea candolleana*
1003. 2140 *Hakea circumalata*
1004. 2146 *Hakea costata (Ribbed Hakea)*
1005. 2175 *Hakea lissocarpha (Honey Bush)*
1006. 16901 *Hakea orthorrhyncha var. filiformis*
1007. 16902 *Hakea orthorrhyncha var. orthorrhyncha*
1008. 2197 *Hakea prostrata (Harsh Hakea)*
1009. 2198 *Hakea pycnoneura*
1010. 2214 *Hakea trifurcata (Two-leaf Hakea)*
1011. 2227 *Isopogon divergens (Spreading Coneflower)*
1012. 2254 *Persoonia acicularis*
1013. 2257 *Persoonia brachystylis (Short-styled Persoonia)* P2
1014. 2290 *Petrophile conifera*
1015. 40740 *Petrophile foremanii*
1016. 2301 *Petrophile macrostachya*
1017. 29192 *Petrophile pilostyla subsp. pilostyla*
1018. 2307 *Petrophile semifurcata*
1019. 15532 *Synaphea spinulosa subsp. spinulosa*
1020. 2330 *Xylomelum angustifolium (Sandplain Woody Pear)*

Psilotaceae

1021. 1 *Psilotum nudum*

Psittacidae

1022. 25716 *Cacatua sanguinea (Little Corella)*
1023. 25717 *Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*
1024. 24734 *Calyptorhynchus latirostris (Carnaby's Cockatoo)*

1025. 24742 *Nymphicus hollandicus (Cockatiel)*

Psoraceae
1026. 27998 *Psora crenata*
1027. 28000 *Psora decipiens*
Pteridaceae
1028. 12818 *Cheilanthes sieberi subsp. sieberi*
Pteropodidae
1029. 24173 *Pteropus scapulatus (Little Red Flying-fox)*
Pygopodidae
1030. 24993 *Aprasia smithi (Black-tipped Worm-lizard)*
1031. *Aprasia sp.*
1032. 24995 *Delma australis*
1033. 24999 *Delma grayii*
1034. 25004 *Delma tincta*
1035. 25005 *Lialis burtonis*
1036. 25006 *Pletholax gracilis subsp. edelensis (Keeled Legless Lizard)*P3
1037. 25007 *Pletholax gracilis subsp. gracilis (Keeled Legless Lizard)*
1038. 25008 *Pygopus lepidopodus (Common Scaly Foot)*
1039. 25009 *Pygopus nigriceps*
Rachycentridae
1040. *Rachycentron canadum*
Rallidae
1041. 25727 *Fulica atra (Eurasian Coot)*
1042. 25730 *Gallirallus philippensis (Buff-banded Rail)*
Ranunculaceae
1043. 10804 *Clematis linearifolia*
Recurvirostridae
1044. 25734 *Himantopus himantopus (Black-winged Stilt)*
Restionaceae
1045. 17685 *Chaetanthus aristatus*
1046. 17663 *Desmocladus asper*
1047. 17846 *Desmocladus parthenicus*
1048. 17621 *Harperia ferruginipes* P1
1049. 13774 *Lepidobolus densus* P3
1050. 18074 *Lepidobolus preissianus subsp. preissianus*
Rhamnaceae
1051. 16018 *Cryptandra arbutiflora var. borealis*
1052. 4794 *Cryptandra glabriflora* P2
1053. 31614 *Cryptandra multispina*
1054. 4802 *Cryptandra mutila*
1055. 14241 *Stenanthemum divaricatum* P3
1056. 16198 *Stenanthemum intricatum*
1057. 15065 *Stenanthemum notiale subsp. notiale*
Rhodomelaceae
1058. 26752 *Dasyclonium incisum*
1059. 26790 *Dipterosiphonia prorepens*
Rubiaceae
1060. 18256 *Opercularia spermacocea*

Rutaceae
1061. 4409 *Boronia coerulescens*
1062. 11274 *Boronia coerulescens subsp. spinescens*
1063. 4414 *Boronia cymosa (Granite Boronia)*
1064. 17664 *Boronia purdieana subsp. calcicola*
1065. 11381 *Boronia ramosa subsp. anethifolia*
1066. 4456 *Diplolaena grandiflora (Wild Rose)*
1067. 15274 *Diplolaena mollis*
1068. 38242 *Geleznowia sp. Marchagee (A. Crawford ADC 1353)*
1069. 38240 *Geleznowia sp. Red Bluff (A. Crawford ADC 597)* P2
1070. 4483 *Geleznowia verrucosa*
1071. 18539 *Philotheca brucei*
1072. 18508 *Philotheca sericea*
Salticidae
1073. *Holoplatys fusca*
1074. *Menemerus bivittatus*
Santalaceae
1075. 2332 *Anthobolus foveolatus*
1076. 10765 *Exocarpos sparteus (Broom Ballart, Djuk)*
1077. 2352 *Leptomeria preissiana*
1078. 2359 *Santalum spicatum (Sandalwood, Wilarak)*
Sapindaceae
1079. 11763 *Diplopeltis intermedia var. incana (Grey Pepperflower)*
1080. 11669 *Diplopeltis intermedia var. intermedia*
1081. 4748 *Diplopeltis petiolaris*
1082. 4754 *Dodonaea aptera (Coast Hop-bush)*
1083. 4756 *Dodonaea caespitosa*
1084. 4775 *Dodonaea pinifolia*
Sargassaceae
1085. 44573 *Sargassopsis decurrens*
1086. 27248 *Sargassum ligulatum*
1087. 27249 *Sargassum linearifolium*
1088. 42785 *Sirophysalis trinodis*
Sciaenidae
1089. *Protonibea sp.* Y
Scincidae
1090. 30893 *Cryptoblepharus buchananii*
1091. 25020 *Cryptoblepharus plagiocephalus*
1092. 25027 *Ctenotus australis*
1093. 25039 *Ctenotus fallens*
1094. 25087 *Cyclodomorphus celatus (Western Slender Blue-tongue)*
1095. 25123 *Lerista axillaris (Stripe-sided Robust Slider, skink)* P2
1096. 25129 *Lerista connivens*
1097. 25133 *Lerista elegans*
1098. 25141 *Lerista humphriesi (Taper-tailed West-coast Slider, skink)* P3
1099. 25144 *Lerista kendricki*
1100. 25148 *Lerista lineopunctulata*
1101. 30922 *Lerista micra*
1102. 25160 *Lerista planiventralis subsp. decora*
1103. 25165 *Lerista praepedita*
1104. 25184 *Menetia greyii*

1105. 25186 *Menetia surda subsp. cresswelli*
1106. 25191 *Morethia lineoocellata*
1107. 25203 *Tiliqua occipitalis (Western Bluetongue)*
1108. 25207 *Tiliqua rugosa subsp. rugosa*

Scolopacidae

1109. 41323 *Actitis hypoleucos (Common Sandpiper)* IA
1110. 25736 *Arenaria interpres (Ruddy Turnstone)* IA
1111. 24780 *Calidris alba (Sanderling)* IA
1112. 24784 *Calidris ferruginea (Curlew Sandpiper)* T
1113. 24788 *Calidris ruficollis (Red-necked Stint)* IA
1114. 30932 *Limosa lapponica (Bar-tailed Godwit)* IA
1115. 24808 *Tringa nebularia (Common Greenshank)* IA

Scolopendridae

1116. *Cormocephalus aurantiipes*
1117. *Cormocephalus turneri*
1118. *Ethmostigmus rubripes*
1119. *Scolopendra laeta*
1120. *Scolopendra morsitans*

Scorpaenidae

1121. *Centropogon australis*

Scorpididae

1122. *Microcanthus strigatus*

Scrophulariaceae

1123. 7055 *Dischisma capitatum (Woolly-headed Dischisma)* Y
1124. 7193 *Eremophila decipiens (Slender Fuchsia)*
1125. 14895 *Eremophila decipiens subsp. decipiens*
1126. 7198 *Eremophila deserti*
1127. 14191 *Eremophila glabra subsp. tomentosa*
1128. 7241 *Eremophila microtheca (Heath-like Eremophila)* P4
1129. 7246 *Eremophila oldfieldii (Pixie Bush)*
1130. 17168 *Eremophila oldfieldii subsp. oldfieldii*
1131. 7289 *Myoporum caprarioides (Slender Myoporum)*

Scutigeridae

1132. *Thereuopoda lesueurii*

Scytosiphonaceae

1133. *Petalonia fascia*

Selaginellaceae

1134. 6 *Selaginella gracillima (Tiny Clubmoss)*

Serpulidae

1135. *Serpulidae sp.* Y

Serranidae

1136. *Acanthistius serratus*
1137. *Epinephelus coioides*
1138. *Epinephelus tauvina*

Sillaginidae

1139. *Sillago schomburgkii*
1140. *Sillago sp.*

Solanaceae
1141. 6945 *Anthocercis genistoides*
1142. 6947 *Anthocercis ilicifolia*
1143. 11537 *Anthocercis ilicifolia subsp. caldariola*
1144. 11725 *Anthocercis ilicifolia subsp. ilicifolia*
1145. 6948 *Anthocercis intricata* P3
1146. 6953 *Anthotroche walcottii*
1147. 6959 *Cyphanthera racemosa*
1148. 6976 *Nicotiana occidentalis (Native Tobacco)*
1149. 6978 *Nicotiana rotundifolia (Round-leaved Tobacco)*
1150. 6988 *Solanum americanum (Glossy Nightshade)* Y
1151. 7018 *Solanum lasiophyllum (Flannel Bush, Mindjulu)*
1152. 7025 *Solanum oldfieldii*
1153. 11241 *Solanum orbiculatum subsp. orbiculatum (Round-leaved Solanum)*
1154. 7037 *Solanum symonii*
Sparassidae
1155. *Isopedella saundersi*
1156. *Pediana occidentalis*
Sparidae
1157. *Acanthopagrus butcheri*
1158. *Rhabdosargus sarba*
Sphacelariaceae
1159. 27293 *Sphacelaria rigidula*
Staphylinidae
1160. *Staphylinidae sp.*
Stylidiaceae
1161. 7672 *Levenhookia octomaculata (Eight-spotted Stylewort)*
1162. 30278 *Stylidium androsaceum*
1163. 7696 *Stylidium calcaratum (Book Triggerplant)*
1164. 7715 *Stylidium dispermum*
1165. 7720 *Stylidium elongatum (Tall Triggerplant)*
1166. 17412 *Stylidium kalbarriense*
1167. 7773 *Stylidium petiolare (Horn Triggerplant)*
1168. 25837 *Stylidium purpureum*
1169. 7785 *Stylidium repens (Matted Triggerplant)*
1170. 19247 *Stylidium septentrionale*
1171. 17510 *Stylidium sp. Kalbarri (A. Carr 145)*
1172. 17578 *Stylidium udusicola*
Surianaceae
1173. 3181 *Stylobasium australe*
1174. 3182 *Stylobasium spathulatum (Pebble Bush)*
Sylviidae
1175. 24834 *Cincloramphus mathewsi (Rufous Songlark)*
Synchaetidae
1176. *Synchaeta tremula*
Tabanidae
1177. *Tabanidae sp.*
Tarsipedidae
1178. 24167 *Tarsipes rostratus (Honey Possum, Noolbenger)*
Teloschistaceae
1179. 30455 *Xanthoria elixii*

1180. 30454 *Xanthoria filsonii*
Testudinellidae
1181. *Testudinella cf. amphora (SAP)*
Thelypteridaceae
1182. 54 *Cyclosorus interruptus*
Theridiidae
1183. *Latrodectus hasseltii*
Threskiornithidae
1184. 24844 *Threskiornis molucca (Australian White Ibis)*
1185. 24845 *Threskiornis spinicollis (Straw-necked Ibis)*
Thymelaeaceae
1186. 5231 *Pimelea angustifolia (Narrow-leaved Pimelea)*
1187. 5246 *Pimelea gilgiana*
1188. 5254 *Pimelea leucantha*
1189. 5256 *Pimelea microcephala (Shrubby Riceflower, Banjine)*
1190. 11185 *Pimelea microcephala subsp. microcephala*
1191. 5263 *Pimelea sessilis*
Tripterygiidae
1192. *Helcogramma decurrens*
Unionicolidae
1193. *Koenikea nr australica (=verrucosa)*
Urolophidae
1194. *Urolophus sp.*
Urticaceae
1195. 12670 *Parietaria cardiostegia*
Varanidae
1196. 25218 *Varanus gouldii (Bungarra or Sand Monitor)*
1197. 25526 *Varanus tristis (Racehorse Monitor)*
Veliidae
1198. *Microvelia (Austromicrovelia) peramoena*
1199. *Microvelia peramoena*
Verbenaceae
1200. 6734 *Phyla nodiflora var. nodiflora* Y
Verrucariaceae
1201. 27983 *Placidium pilosellum*
1202. 27984 *Placidium squamulosum*
Vespertilionidae
1203. 24194 *Nyctophilus geoffroyi (Lesser Long-eared Bat)*
1204. 24205 *Vespadelus finlaysoni (Finlayson's Cave Bat)*
Violaceae
1205. 5216 *Hybanthus calycinus (Wild Violet)*
1206. 12007 *Hybanthus floribundus subsp. floribundus*
Vitaceae
1207. 4853 *Clematicissus angustissima*
Xanthorrhoeaceae
1208. 1252 *Xanthorrhoea drummondii*
Zodariidae
1209. *Euasteron carnarvon*
1210. *Masasteron sampeyae*
1211. *Storena formosa*
Zosteropidae

1212. 25765 *Zosterops lateralis (Grey-breasted White-eye, Silvereye)*

Zygophyllaceae

1213. 4385 *Zygophyllum apiculatum (Gallweed)*

1214. 4390 *Zygophyllum fruticulosum (Shrubby Twinleaf)*

APPENDIX C: EPBC Act Protected Matters Report

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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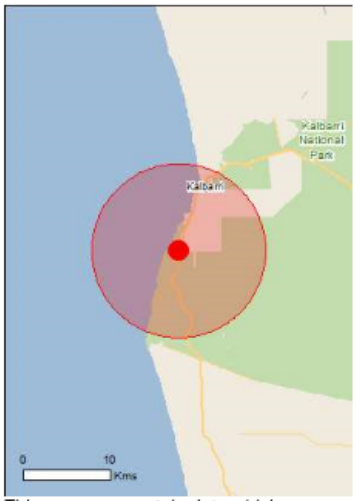

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Coordinates
Buffer: 10.0Km

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	38
Listed Migratory Species:	35

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	64
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	12
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	1

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

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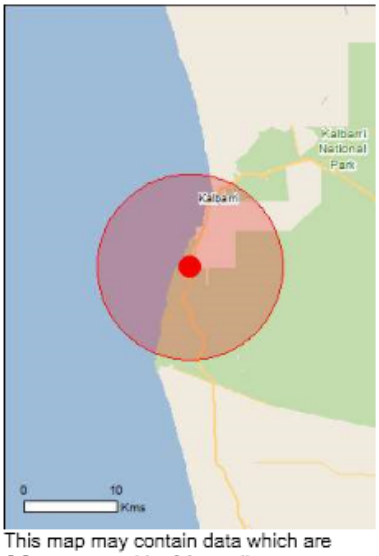

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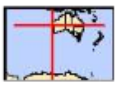

Summary

Matters of National Environmental Significance

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World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	38
Listed Migratory Species:	35

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

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A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	64
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	12
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	1

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea

Marine Regions [Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
North-west
South-west

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Diomedea exulans amsterdamensis Amsterdam Albatross [82330]	Endangered	Species or species habitat may occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area

Name	Status	Type of Presence
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Species or species habitat may occur within area
Other		
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat may occur within area
Plants		
Beyeria lepidopetala Small-petalled Beyeria, Short-petalled Beyeria [18362]	Endangered	Species or species habitat likely to occur within area
Caladenia barbarella Small Dragon Orchid, Common Dragon Orchid [68686]	Endangered	Species or species habitat may occur within area
Caladenia bryceana subsp. cracens Northern Dwarf Spider-orchid [64556]	Vulnerable	Species or species habitat known to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area
Drakaea concolor Kneeling Hammer-orchid [56777]	Vulnerable	Species or species habitat likely to occur within area
Hypocalymma longifolium Long-leaved Myrtle [8081]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Lechenaultia chlorantha Kalbarri Leschenaultia [16763]	Vulnerable	Species or species habitat likely to occur within area
Stachystemon nematophorus Three-flowered Stachystemon [81447]	Vulnerable	Species or species habitat may occur within area
Wurmbea tubulosa Long-flowered Nancy [12739]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered*	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered*	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stigmatopora olivacea a pipefish [74966]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area

Name	Status	Type of Presence
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Kalbarri	WA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		

Name	Status	Type of Presence
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Murchison River (Lower Reaches)	WA

Key Ecological Features (Marine) [Resource Information]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Western rock lobster	South-west

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.76882 114.13957

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX D: Flora Plot Maps and Species Lists

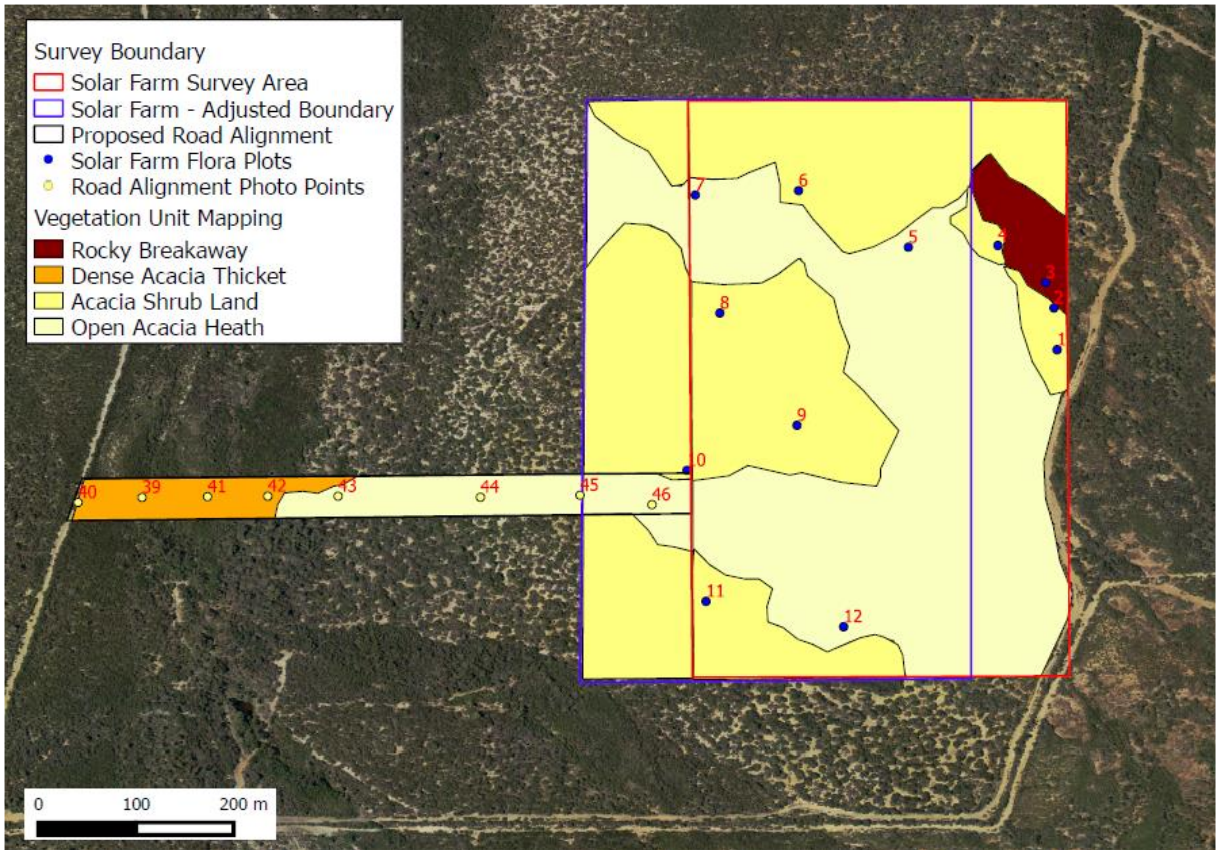


Figure: Flora Plots in the Solar Farm and Proposed Road Alignment Survey Areas

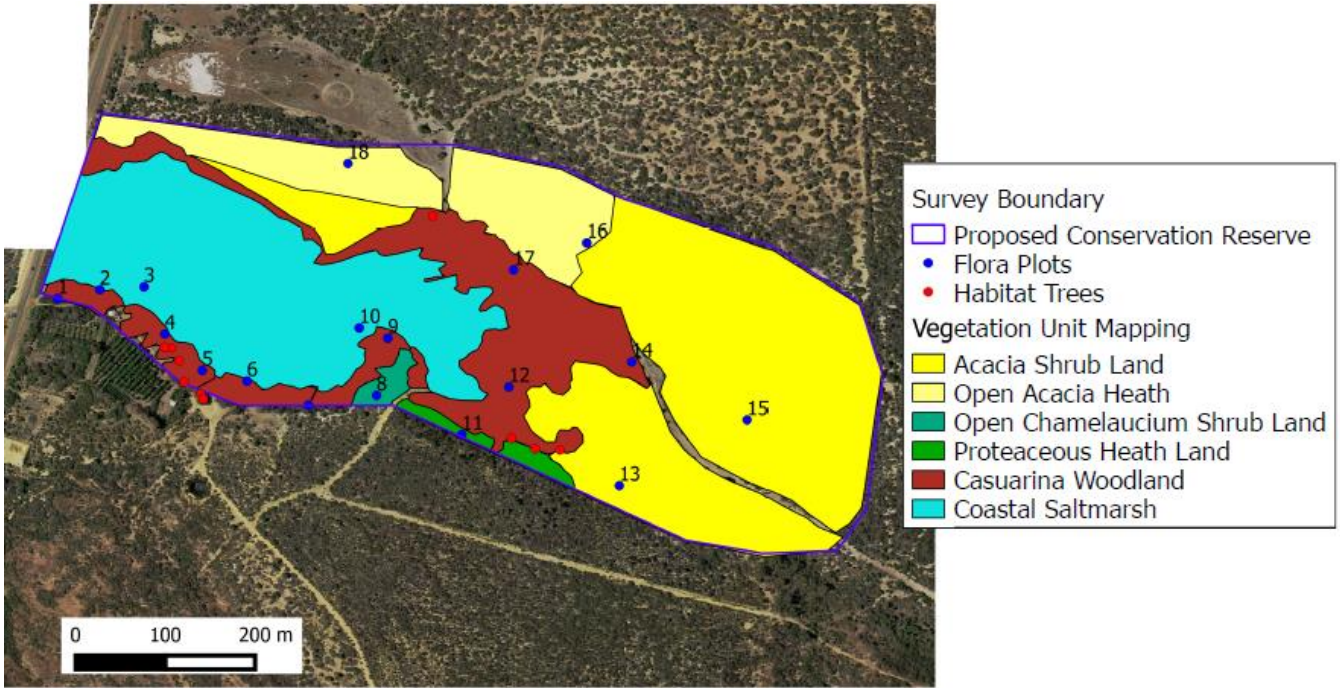


Figure: Flora Plots in the Proposed Wittecarra Creek Conservation Reserve Survey Area

SOLAR FARM FLORA PLOTS

Plot 1: Tall *Acacia* dominated shrub land on yellow sand.

Family	Species	Common Name
Asteraceae	*Arctotheca calendula**	Cape Weed
Asteraceae	*Lawrencella rosea*	
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Fabaceae	*Acacia oldfieldii*	
Fabaceae	*Jacksonia cupulifera*	
Goonediaceae	*Goodenia berardiana*	
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Poaceae	*Austrostipa nitida*	
Myrtaceae	*Baeckea robusta*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya

Plot 2: Rock edge yellow sand

Family	Species	Common Name
Araliaceae	*Trachymene ornata*	Spongefruit
Fabaceae	*Labichea lanceolata*	Tall Labichea
Fabaceae	Leptosema aphyllum	
Myrtaceae	Melaleuca megacephala	

Plot 3: Red Sandstone rocky outcrop

Family	Species	Common Name
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Asteraceae	*Calocephalus francisii*	Fine-leaf Beauty-heads
Asteraceae	*Gnephosis tenuissima*	
Asteraceae	*Helipterum craspedioides*	Yellow Billy Buttons
Asteraceae	*Pogonolepis stricta*	
Casuarinaceae	*Allocasuarina campestris*	
Fabaceae	*Jacksonia cupulifera*	
Myrtaceae	*Calothamnus quadrifidus ssp homalophyllus*	Murchison Claw Flower
Portulaceae	*Calandrinia ploryandra*	Parakeelya
Proteaceae	*Grevillea pinaster*	
Proteaceae	*Hakea orthorrhyncha*	Bird Beak Hakea

Plot 4: Tall dense *Acacia*/ Scholtzia shrub land 5-7m tall

Family	Species	Common Name
Araliaceae	*Trachymene ornata*	Sponge fruit
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Asteraceae	*Arctotheca calendula**	Cape Weed
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Fabaceae	*Acacia oldfieldii*	
Fabaceae	*Jacksonia cupulifera*	
Fabaceae	*Labichea lanceolata*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Goodeniaceae	*Goodenia berardiana*	
Myrtaceae	*Calothamnus quadrifidus ssp homalophyllus*	Murchison Claw Flower
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Grevillea pinaster*	

Plot 5: low and open *Acacia* heath over yellow sand

Family	Species	Common Name
Araliaceae	*Trachymene ornata*	Spongefruit
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Asteraceae	*Olearia axillaris*	Coastal Daisybush
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Ericaceae	*Astroloma glaucescens*	
Fabaceae	*Acacia oldfieldii*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Fabaceae	Leptosema aphyllum	
Myrtaceae	*Calothamnus quadrifidus ssp homalophyllus*	Murchison Claw Flower
Myrtaceae	*Melaleuca megacephala*	
Poaceae	*Ehrharta longifolia**	
Polygalaceae	*Comesperma scoparium*	Broom Milkwort
Polygonaceae	*Muehlenbeckia adpressa*	Climbing Lignum
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Grevillea pinaster*	
Proteaceae	*Hakea orthorrhyncha*	Bird Beak Hakea
Restionaceae	*Desmocladus asper*	
Solanaceae	*Solanum lasiophyllum*	Flannel Bush

Plot 6: Low and open *Acacia* heath over yellow sand

Family	Species	Common Name
Asteraceae	*Gnephosis tenuissima*	
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Casuarinaceae	*Allocasuarina campestris*	
Fabaceae	*Acacia scirpifolia*	
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Myrtaceae	*Calytrix brevifolia*	
Poaceae	*Ehrharta longifolia**	

Plot 7: Low and open *Acacia* heath over yellow sand

Family	Species	Common Name
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Casuarinaceae	*Allocasuarina campestris*	
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Ericacea	*Leucopogon cordifolius*	Heart-leaf Beard heath
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Halogoraceae	*Glischrocaryon aureum*	Common Popflower
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Conospermum stoechadis*	Common Smokebush
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Solanaceae	*Solanum lasiophyllum*	Flannel Bush
Stylidiaceae	*Stylidium sp. Kalbarri*	

Plot 8: Tall *Acacia* scirpifolia shrub land over yellow sand

Family	Species	Common Name
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Fabaceae	*Acacia scirpifolia*	
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Myrtaceae	*Melaleuca megacephala*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Banksia prionotes*	Acorn Banksia
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea

Plot 9: *Acacia* scirpifolia shrub land on yellow soil

Family	Species	Common Name
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Casuarinaceae	*Allocasuarina campestris*	
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Ericacea	*Leucopogon cordifolius*	Heart-leaf Beard heath
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Conospermum stoechadis*	Common Smoke Bush
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Solanaceae	*Solanum lasiophyllum*	Flannel Bush
Stylidiaceae	*Stylidium sp. Kalbarri*	

Plot 10: *Acacia* scirpifolia shrubland on yellow soil

Family	Species	Common Name
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Casuarinaceae	*Allocasuarina campestris*	
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Lamiaceae	*Lachnostachys eriobotrya*	Lambswool
Myrtaceae	*Baeckea robusta*	
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Myrtaceae	*Thryptomene denticulata*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Conospermum stoechadis*	Common Smoke Bush
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Solanaceae	*Solanum lasiophyllum*	Flannel Bush

Plot 11: *Acacia* scirpifolia shrub land on yellow soil

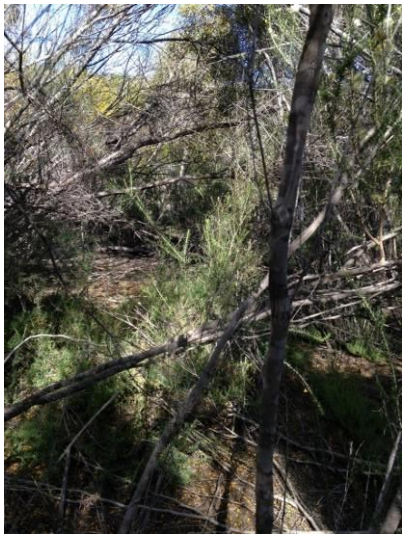
Family	Species	Common Name
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Casuarinaceae	*Allocasuarina campestris*	
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Myrtaceae	*Melaleuca megacephala*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Solanaceae	*Solanum lasiophyllum*	Flannel Bush

Plot 12: Low *Acacia* scrub on yellow sand

Family	Species	Common Name
Asteraceae	*Podotheca gnaphliodes*	Golden Long-heads
Casuarinaceae	*Allocasuarina campestris*	
Cupressaceae	*Callitris arenaria*	Sandplain Cypress
Ericacea	*Leucopogon cordifolius*	Heart-leaf Beard heath
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Halogoraceae	*Glischrocaryon aureum*	Common Pop Flower
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Conospermum stoechadis*	Common Smoke Bush
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Solanaceae	*Solanum lasiophyllum*	Flannel Bush
Stylidiaceae	*Stylidium sp. Kalbarri*	

PROPOSED ROAD ALIGNMENT WEST OF SOLAR FARM

Images along the proposed alignment



WPT 39 – *Acacia*/ Melaleuca thicket

WPT 40 – Dense *Acacia* scirpifolia

BA01 – Mature Banksia prionotes, surrounded by many dead stags. Healthy Banksias associated only with the ridgeline

WPT 41 Dense *Acacia*/ Melaleuca scrub with occasional Grevillea leucopteris

WPT 42 *Acacia* scirpifolia thicket

WPT 43 Open *Acacia* shrubland

Images continued

WPT 44 *Acacia* oldfieldii shrub land

WPT 45 *Acacia* oldfieldii shrub land

WPT 46 Open *Acacia* shrub land

Species observed along the proposed road alignment

Family	Species	Common Name
Anarthriaceae	*Lyginia imberbis*	
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Fabaceae	*Acacia oldfieldii*	
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Gompholobium tomentosum*	Hairy Yellow Pea
Fabaceae	*Jacksonia cupulifera*	
Fabaceae	*Labichea lanceolata*	Tall Labichea
Fabaceae	Leptosema aphyllum	
Fabaceaea	*Acacia quadrisulcata*	
Iridaceae	*Patersonia occidentalis var. latifolia*	
Lamiaceae	*Lachnostachys eriobotrya*	Lambswool
Myrtaceae	*Baeckea robusta*	
Myrtaceae	*Calytrix brevifolia*	
Myrtaceae	*Melaleuca megacephala*	
Myrtaceae	*Scholtzia sp. Red Bluff*	
Myrtaceae	*Thryptomene denticulata*	
Polygalaceae	*Comesperma scoparium*	Broom Milkwort
Polygonaceae	*Muehlenbeckia adpressa*	
Portulaceae	*Calandrinia ployandra*	Parakeelya
Proteaceae	*Banksia prionotes*	Acorn Banksia
Proteaceae	*Grevillea leucopteris*	White Plume Grevillea
Stylidiaceae	*Stylidium sp. Kalbarri*	

WITTECARRA CREEK CONSERVATION RESERVE

Plot 1: Casuarina/ Eucalypt woodland with an understorey of dense litter over brown loamy sand

Family	Species	Common Name
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Loranthaceae	*Amyema linophylla subsp. linophylla*	
Myrtaceae	*Eucalyptus camaldulensis subsp. obtusa*	Blunt-budded River Red Gum

Plot 2: Fringing vegetation dominated by *Atriplex*, *Tetricornia* and weeds

Family	Species	Common Name
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Asteraceae	*Arctotheca calendula**	Cape Weed
Asteraceae	*Sonchos oleraceus**	Common Sow Thistle
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Chenopodium album**	Fat Hen
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Fabaceae	*Melilotus indicus**	
Loranthaceae	*Amyema linophylla subsp. linophylla*	
Poaceae	*Ehrharta longiflora**	
Poaceae	*Eriachne aristidea*	
Poaceae	*Hordeum hystrix**	Barley Grass

Plot 3: Samphire over salt pan

Family	Species	Common Name
Aizoaceae	*Gunniopsis septifraga*	
Chenopodiaceae	*Tetricornia halocnemoides*	Red Samphire
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Crassulaceae	*Crassula colorata*	

Plot 4: *Casuarina* woodland with weedy understorey

Family	Species	Common Name
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Asteraceae	*Arctotheca calendula**	Cape Weed
Asteraceae	*Sonchos oleraceus**	Common Sow Thistle
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Chenopodium album**	Fat Hen
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Melilotus indicus**	
Poaceae	*Ehrharta longiflora**	
Poaceae	*Eriachne aristidea*	
Poaceae	*Hordeum hystrix**	Barley Grass

Plot 5: *Casuarina* woodland

Family	Species	Common Name
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Chenopodiaceae	*Rhagodia preissii subsp. obovata*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Lauraceae	*Cassytha aurea var. aurea*	
Loranthaceae	*Amyema linophylla subsp. linophylla*	
Myrtaceae	*Eucalyptus camaldulensis subsp. obtusa*	Blunt-budded River Red Gum

Plot 6: Melaleuca thicket

Family	Species	Common Name
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Lauraceae	*Cassytha aurea var. aurea*	
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark

Plot 7: Open *Casuarina* Woodland

Family	Species	Common Name
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Lauraceae	*Cassytha aurea var. aurea*	
Loranthaceae	*Amyema linophylla subsp. linophylla*	

Plot 8: Chamelaucium heath land

Family	Species	Common Name
Amaranthaceae	*Ptilotus polystachyus*	Prince of Wales Feather
Asteraceae	*Calocephalus francisii*	Fine-leaf Beauty-heads
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Dilleniaceae	*Hibbertia spicata*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Acacia scirpifolia*	
Goodeniaceae	*Dampiera spicigera*	Spiked Dampiera
Myrtaceae	*Calothamnus sanguineus*	Silky-leaved Blood flower
Myrtaceae	*Chamelaucium marchantii* (P3)	
Myrtaceae	*Melaleuca megacephala*	
Poaceae	*Austrostipa macalpinei*	
Proteaceae	*Banksia menziesii*	Firewood Banksia
Solanaceae	*Anthocercis ilicifolia subsp. caldariola*	

Plot 9: Open *Casuarina* woodland

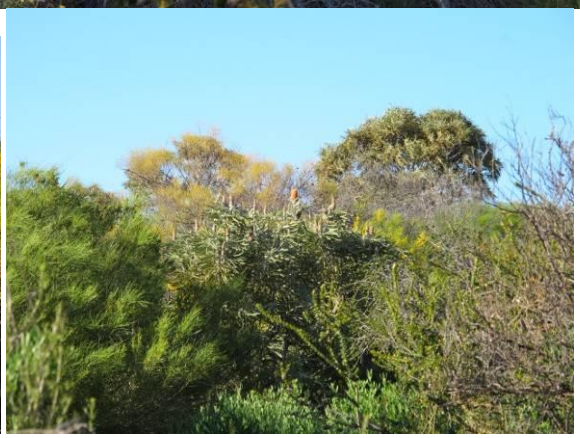
Family	Species	Common Name
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Lauraceae	*Cassytha aurea var. aurea*	
Loranthaceae	*Amyema linophylla subsp. linophylla*	

Plot 10: Samphire wetland fringe

Family	Species	Common Name
Aizoaceae	*Gunniopsis septifraga*	
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Asteraceae	*Arctotheca calendula**	Cape Weed
Chenopodiaceae	*Tetricornia halocnemoides*	Red Samphire
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Crassulaceae	*Crassula colorata*	
Poaceae	*Hordeum hystrix**	Barley Grass
Poaceae	*Parapholis incurva*	Coast Barb Grass
Poaceae	*Rostraria cristata*	

Plot 11: Proteaceous Heath Land



Family	Species	Common Name
Amaranthaceae	*Ptilotus polystachyus*	Prince of Wales Feather
Araliaceae	*Trachymene ornata*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	
Goodeniaceae	*Dampiera spicigera*	Spiked Dampiera
Haemodoraceae	*Conostylis robusta*	
Haemodoraceae	*Conostylis stylidioides*	
Lauraceae	*Cassytha aurea var. aurea*	
Malvaceae	*Commersonia densiflora*	
Malvaceae	*Lasiopetalum sp.*	(specimen with Herbarium)
Myrtaceae	*Calothamnus sanguineus*	Silky-leaved Blood flower
Myrtaceae	*Melaleuca megacephala*	
Poaceae	*Austrostipa macalpinei*	
Poaceae	*Austrostipa nitida*	
Poaceae	*Eriachne aristada*	
Polygalaceae	*Comesperma scoparium*	Broom Milkwort
Portulacaceae	*Calandrinia polyandra*	Parakeelya
Proteaceae	*Banksia menziesii*	Firewood Banksia
Proteaceae	*Banksia prionotes*	Acorn Banksia
Solanaceae	*Anthocercis ilicifolia subsp. caldariola*	

Plot 12: *Casuarina* woodland/ fringing vegetation

Family	Species	Common Name
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	2 *Enchylaena tomentosa*	Barrier Saltbush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark

Plot 13: *Acacia*/ Melaleuca shrub land on grey sand

Family	Species	Common Name
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Asteraceae	*Arctotheca calendula**	Cape Weed
Chenopodiaceae	3 *Enchylaena tomentosa*	Barrier Saltbush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Lauraceae	*Cassytha aurea var. aurea*	
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark
Poaceae	*Eriachne aristada*	

Plot 14: *Acacia* shrub land

Family	Species	Common Name
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Acacia scirpifolia*	
Myrtaceae	*Melaleuca megacephala*	
Poaceae	*Austrostipa nitida*	
Poaceae	*Eriachne aristada*	

Plot 15: Open Melaleuca/ *Acacia* heath land

Family	Species	Common Name
Araliaceae	*Trachymene ornata*	
Asparagaceae	*Thysanotus manglesianus*	Fringed Lily
Chenopodiaceae	*Atriplex amnicola*	Swamp Salt Bush
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Acacia scirpifolia*	
Myrtaceae	*Melaleuca megacephala (tall)*	
Poaceae	*Austrostipa macalpinei*	
Poaceae	*Austrostipa nitida*	
Poaceae	*Eriachne aristada*	
Portulaceae	*Calandrinia ployandra*	Parakeelya
Solanaceae	*Anthocercis ilicifolia subsp. caldariola*	

Plot 16 *Casuarina* woodland

Family	Species	Common Name
Aizoaceae	*Mesembryanthemum crystallinum**	Ice plant
Asteraceae	*Arctotheca calendula**	Cape Weed
Asteraceae	*Sonchos oleraceus**	Common Sow Thistle
Casuarinaceae	*Casuarina obesa*	Swamp Sheoak
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Chenopodiaceae	*Tetricornia indica ssp. bidens*	Green Samphire
Loranthaceae	*Amyema linophylla subsp. linophylla*	

Plot 17 Low open *Acacia* heath

Family	Species	Common Name
Araliaceae	*Trachymene ornata*	
Asparagaceae	Acanthocarpus sp. Ajana	
Asteraceae	*Arctotheca calendula**	Cape Weed
Chenopodiaceae	*Rhagodia latifolia subsp latifolia*	
Crassulaceae	*Crassula colorata*	
Fabaceae	*Acacia rostellifera*	Summer-scented Wattle
Fabaceae	*Acacia scirpifolia*	
Fabaceae	*Labichea lanceolata*	
Myrtaceae	*Baeckea pentagonantha*	
Myrtaceae	*Melaleuca megacephala*	
Polygonaceae	*Muehlenbeckia adpressa*	
Portulaceae	*Calandrinia ploryandra*	Parakeelya
Solanaceae	*Anthocercis ilicifolia subsp. caldariola*	

APPENDIX E: Condition Rating Scale (Keighery 1994)

Vegetation Condition Rating	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very good	Vegetation structure altered, obvious signs of disturbance.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate to it.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species.

APPENDIX F: Criteria Used in the Environmental Weed Strategy for Western Australia

- Invasiveness ability to invade bushland in good to excellent condition or ability to invade waterways. (Score as yes or no).
- Distribution - wide current or potential distribution including consideration of known history of wide-spread distribution elsewhere in the world. (Score as yes or no).
- Environmental Impacts - ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community. (Score as yes or no).

The rating of each weed was then determined by the following scoring system:

- High - a weed species would have to score yes for all three criteria. Rating a weed species as high would indicate prioritising this weed for control and/or research i.e. prioritising funding to it.
- Moderate - a weed species would have to score yes for two of the above criteria. Rating a weed species as moderate would indicate that control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring).
- Mild - a weed species scoring one of the criteria. A mild rating would indicate monitoring of the week and control where appropriate.
- Low - a weed species would score none of the criteria. A low ranking would mean that this species would require a low level of management

APPENDIX G: Definitions of Conservation codes

Under the Wildlife Conservation Act 1950, the Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection. Schedules 1 and 2 deal with those that are threatened and that are presumed extinct, respectively.

- ***T: Threatened Flora (Declared Rare Flora — Extant)***

  Taxa1 which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 under the Wildlife Conservation Act 1950).

  Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using International Union for Conservation of Nature (IUCN) Red List criteria:

  CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild

  EN: Endangered – considered to be facing a very high risk of extinction in the wild

  VU: Vulnerable – considered to be facing a high risk of extinction in the wild.

- ***X: Presumed Extinct Flora (Declared Rare Flora — Extinct)***

  Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the Wildlife Conservation Act 1950).

Taxa that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Taxa that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. "Conservation Dependent" species are placed in Priority 5.

- ***Priority 1*** *- Poorly known Taxa. Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey;*
- ***Priority 2*** *- Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey;*
- ***Priority 3 -*** *Poorly Known Taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey;*
- ***Priority 4 -*** *Rare Taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years; and*
- ***Priority 5 -*** *Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years*